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AN ADDITIONAL SPECIES OF *GNAPHALIOTHAMNUS* (ASTERACEAE:  
INULEAE) AND FURTHER EVIDENCE FOR THE INTEGRITY OF THE GENUS

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ABSTRACT

*Gnaphaliothamnus durangensis* spec. nov. is described from southeastern Durango, México, bringing to 10 the number of species in the genus. The new species is most similar to *G. concinnus* (A. Gray) Nesom of San Luis Potosí and related to other species with eglandular leaf surfaces. The occurrence in central Oaxaca of putative hybrids between the strongly divergent species *G. eleagnoides* (Klatt) Nesom and *G. aecidiocephalus* (Grierson) Nesom strengthens the hypothesis that the genus is monophyletic.

KEY WORDS: *Gnaphaliothamnus*, Asteraceae, Inuleae, México.

Shortly after completion of a systematic study of *Gnaphaliothamnus* (Nesom 1990), a new species has come to light in the course of a study of Mexican Inuleae at MEXU. The new species is known from only a single collection in southeastern Durango.

*Gnaphaliothamnus durangensis* Nesom, spec. nov. TYPE: MÉXICO. Durango: Mpio. Durango, 65-75 km SW of Durango City on road to La Flor, high ridge with meadows and forests of *Pinus*, *Quercus*, and *Pseudotsuga*, 2620 m, 17 Sep 1979, D.E. Breedlove 44285 (HOLOTYPE: MEXU!; Isotype: CAS).

*Gnaphaliothamnus concinno* (A. Gray) Nesom similis sed phyllariis ovatis apicibus rotundatis subroseis differt.

Suffrutescent herbs 1.5-2.5 cm tall, stems and leaves densely woolly tomentose. Leaves bicolored, glabrescent above, but remaining pubescent to a degree, eglandular, the upper spreading at right angles to the stem, senescent and deflexed on the lower half of the stem, elliptic-obovate, 1-2 cm long, 3-5 mm wide, with a terminal mucro, slightly decurrent, the margins very slightly revolute. Heads campanulate, short pedicellate in compact clusters of 8-12,



barely raised above the leaves; phyllaries 24-28, ovate to broadly ovate, the distal 1/3 pinkish and not narrowed-elongated or strongly opaque, strongly graduated in 5-6 series, the inner 4.0-4.5 mm long, the outer loosely and persistently woolly on the proximal 2/3. Mature corollas and fruits not seen; pappus bristles of hermaphroditic flowers with swollen clavellate apices.

The eglandular leaves of *Gnaphaliothamnus durangensis* ally it with *G. salicifolius* (Bertol.) Nesom and its relatives, as opposed to those with glandular upper surfaces. The new species is similar in leaf shape to *G. concinnus* (A. Gray) Nesom and *G. eleagnoides* (Klatt) Nesom. It is most similar to the former in its persistently pubescent upper leaf surfaces and outer phyllaries, and its relatively few heads barely lifted above the leaves. It differs from both of these species in its ovate phyllaries with pinkish apices that are not indurated opaque and not narrowed into an appendagelike apical extension. The only other species of *Gnaphaliothamnus* in western México is *G. salicifolius*, which has longer (2-8 cm long) leaves with strongly glabrate upper surfaces, more numerous heads in dense corymbs held above the leaves, longer phyllaries with thicker and narrowed apices, and pappus bristles with only slightly dimorphic apices. Heads on plants of the type collection of *G. durangensis* are not mature enough to enable a count of hermaphroditic and pistillate flowers, but both types apparently are present.

#### Evidence for the generic integrity of *Gnaphaliothamnus*.

The woody, "central-sterile," gnaphalioid plants of México and Central America with red corollas and petaloid phyllary apices have been considered by Anderberg & Freire (1989) to be in two genera, *Chionolaena* and *Gnaphaliothamnus*. In contrast, a rationale for including all 9 (now 10) species of these taxa in *Gnaphaliothamnus* was recently presented (Nesom 1990). The occurrence of morphological intermediates between two strongly divergent species of this group, *G. aecidiocephalus* (Grierson) Nesom (a member of *Chionolaena* fide Anderberg & Freire) and *G. eleagnoides*, strengthens the hypothesis that they are congeneric.

Both *Gnaphaliothamnus aecidiocephalus* and *G. eleagnoides* are endemic to central Oaxaca. The former is known only from the Cerro del Humo (the type locality) and the Sierra de Juárez; the latter has only a slightly wider range and is at least partially sympatric with the former. The only other species of *Gnaphaliothamnus* that occurs in the same area is *G. salicifolius*. I recently considered the closest relative of *G. aecidiocephalus* to be *G. concinnus* on the basis of its similarity in leaf morphology and incipient dioecism (Nesom 1990). *Gnaphaliothamnus eleagnoides* was hypothesized to be most closely related to *G. salicifolius* (the type of the genus), and all these species were considered to be more closely related among themselves than to a group of four species within the genus that have glandular leaf surfaces.

*Gnaphaliothamnus aecidiocephalus* is strictly dioecious and the plants have densely crowded, overlapping, strongly deflexed, obovate leaves 2.5-4.5 mm long and densely close tomentose above, sessile heads in terminal clusters of 2-3, and phyllaries with a distinctly purplish red medial area. Plants of *G. eleagnoides* have strictly heterogamous heads, spreading, oblanceolate leaves 15-42 mm long and glabrous above, distinctly pedicellate heads in corymboid clusters of 15-40, held well above the leaves, and phyllaries with white apices but without any red coloration.

Two duplicate sheets of a collection made in the Cerro del Humo bear branches of plants that appear to represent two separate taxa (27 Jan 1963, 3000 m, *MacDougal s.n.* [MEXU]). Several of these branches have heterogamous heads and can be clearly identified as *Gnaphaliothamnus eleagnoides*, although they have relatively shorter leaves (10-15 mm long), a slightly reduced number of pistillate flowers (11-13), and close to a 1:1 ratio of pistillate:hermaphroditic flowers. The other branches on these two sheets appear to be intermediate between *G. eleagnoides* and *G. aecidiocephalus* in a number of features, prominently including leaf size (5-8 mm long), shape (obovate-oblanceolate), arrangement (spreading-deflexed, not so densely overlapping as in *G. aecidiocephalus*), and vestiture (tomentose above but not densely so). The heads are sessile in compact, terminal clusters of 8-12. Some heads are all staminate, but some have 1-3 filiform-tubular flowers in the outermost series. These flowers are without anthers and have pappus bristles with barely expanded apices, as is characteristic of pistillate flowers in the group, but they are immature and it is not possible to tell if they are producing fertile ovaries. The phyllaries have white apices but are faintly pink below that.

The evidence strongly suggests that these flowering branches of intermediate morphology represent hybrid plants and that the parental taxa should be considered congeneric.

#### ACKNOWLEDGMENTS

I thank Drs. Billie Turner and Andrew McDonald for their review and comments on the manuscript and the staff at MEXU for their help during a recent visit there.

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## TAXONOMY OF *VARILLA* (ASTERACEAE: HELIANTHEAE)

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### ABSTRACT

A taxonomic treatment of *Varilla* is rendered. Two species are recognized, *V. mexicana* and *V. texana*, the former having two varieties, one of these, *Varilla mexicana* var. *gypsophila* B. Turner, is newly described. Both species occur in northeastern México, *V. texana* also occurring in adjacent Texas. Illustrations and distribution maps for both species are provided.

KEY WORDS: *Varilla*, Asteraceae, Heliantheae, México.

The genus *Varilla* was first established by Asa Gray with his description of *V. mexicana* from collections obtained by Dr. Wislizenus in northeastern Durango and Dr. Gregg in southernmost Coahuila. Gray subsequently added a second, very different species, *V. texana*, based on collections made by Charles Wright in Texas. In the present paper, with the description of *V. mexicana* var. *gypsophila*, I have added a third taxon to the genus, a rather distinct regional element largely confined to gypseous soils of west central Coahuila.

### CHROMOSOME NUMBERS

All of the taxa have been investigated chromosomally, and all have chromosome numbers of  $n = 18$  pairs. References to these are provided below. It is my assumption that the haploid number,  $n = 18$ , is of ancient origin, probably a polyploid on an ancestral base of  $x = 9$ .

## GENERIC RELATIONSHIPS

Turner & Powell (1977) have discussed the likely relationships of *Varilla*, concluding that it belongs to the tribe Heliantheae, in the subtribe Varillinae along with several other genera, in particular *Clappia* ( $x = 16$ ), *Pseudoclappia* ( $x = 18$ ) and perhaps the anomalous genera *Bebbia* ( $x = 9$ ) and *Dyscritothamnus* ( $x = ?$ ). In short, they felt that *Varilla* represented an ancestral "prototype" from which these several genera might have arisen, all or most of them occurring in dry, mostly saline habitats of northern México. Robinson (1981) accepted the subtribal position of *Varilla*, but positioned both *Clappia* and *Pseudoclappia* as the only members of a newly erected, but closely related, subtribe Clappiinae. He correctly noted that *Bebbia* and *Dyscritothamnus* are "unquestionably members of the Galinsoginae and are not closely related to *Varilla* ...".

## TAXONOMY

*Varilla* A. Gray, Mem. Amer. Acad. Arts 4:106. 1849. Type species: *Varilla mexicana* A. Gray.

Shrubs or succulent shrublets 0.5-3.0 m high. Stems glabrous or nearly so, brittle and erect or recumbent and subsucculent or carnose. Leaves alternate or mostly opposite, filiform and succulent or linear lanceolate and flattened, often with punctate glands. Heads discoid, 5-50 in terminal subfasciculate cymules, or solitary and terminal, borne on elongate peduncles. Involucres turbinate to hemispheric, 4-8 seriate, markedly imbricate to subimbricate, the bracts ovate lanceolate to lanceolate, glabrous, well bestowed with oil bearing striations or raised linear ducts. Receptacle ovoid or conical, paleate, the pales like the involucral bracts. Ray florets absent. Disk florets numerous, yellow, the throat tubular with orange, oil bearing, ducts or striations. Achenes prismatic or columnar, black, with 7-9 ribs, the pappus absent or of a few short bristles. Base chromosome number,  $x = 18$ .

## KEY TO SPECIES

1. Low succulent shrublets with recumbent stems to 50 cm high; leaves mostly alternate, narrowly terete, ca. 1 mm wide ..... *V. texana*

- 1' Erect nonsucculent shrubs 0.7-3.0 m high; leaves mostly opposite, linear lanceolate, flattened, mostly 2-10 mm wide ..... *V. mexicana*

*Varilla mexicana* A. Gray, Mem. Amer. Acad. Arts 4:106. 1849. Figure 1.

TYPE: MÉXICO. Durango: between Pelayo and Cadena, without date, *Dr. Wislizenus* 275 (LECTOTYPE [selected here]: GH!).

The protologue lists two collections, the above and "Valley east of Parras, *Dr. Gregg*; April." Both are mounted on a single sheet at GH and both fall within the concept of the typical variety as conceived here (Figure 1). The lectotype is the better preserved of the two collections, containing both flower and fruiting material, matching closely the description provided by its author.

Shrubs 1-3 m high. Stems glabrous, brittle, with age the bark somewhat corky; leaves mostly opposite, those of primary shoots linear, mostly 7-8 cm long, 2-4(-5) mm wide, glabrous, the apices gradually narrowed to very slender apices. Heads 5-15 in terminal corymbs, the ultimate peduncles mostly 5-15 mm long. Involucre, in fruit, decidedly turbinate, somewhat higher than wide, 5-6 mm high, the bracts 1-2 seriate, subgraduate, linear lanceolate, with 1-2 orange linear ducts adorning the dorsal surfaces, similar to and grading into the receptacular pales. Florets numerous, the corollas 3.5-5.0 mm long, yellow, the tube ca. 1.5 mm long, sparsely glandular pubescent, the throat abruptly tubular, 1.5-3.0 mm long, the lobes ca. 0.75 mm long. Achene 2-3 mm long, 8-9 ribbed, black at maturity, sparsely pubescent with crinkly hairs, the pappus of 5-8 poorly developed awns 0.2-0.7 mm long, sometimes epappose. Chromosome number,  $n = 18$  pairs (Turner & Flyr 1966).

Two varieties of this species are recognized; these are contrasted in the following couplet.

1. Achenes 1.5-1.9 mm long, glabrous or nearly so; leaves of primary shoots mostly 4-8 mm wide; mostly growing on gypseous soils . var. *gypsophila*
- 1' Achenes 2.0-3.9 mm long, to some extent pubescent; leaves of primary shoots mostly 2-4 mm wide; mostly growing on calcareous soils ..... var. *mexicana*

*Varilla mexicana* A. Gray var. *gypsophila* B. Turner, var. nov. TYPE: MÉXICO. Coahuila: ca. 85 air miles W of Cuatro Ciénegas, ca. 2 miles S of Salinas del Rey del Norte, on NW side of Laguna del Rey; on gypsum sand above lake, 1050 m, 19 Sep 1974, *James Henrickson* 1414 (HOLOTYPE: LL; Isotype: MEXU).

*Varilla mexicana* var. *mexicana* similis sed acheniis brevioribus plerumque glabrisque, surculis primariis foliis latioribus, et habitationibus in terris gypсорum differt.





FIG. 1. *VARILLA MEXICANA* VAR. *MEXICANA* (POWELL  
1867, TEX).

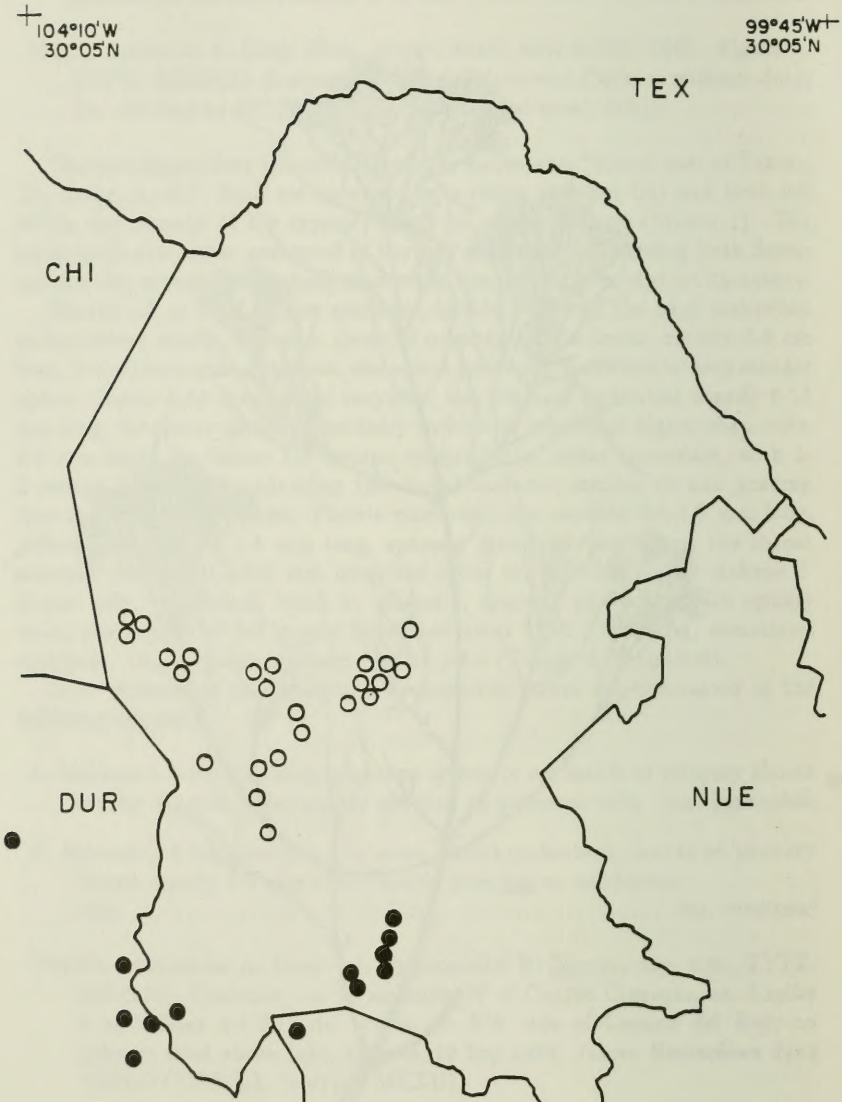


FIG. 2. DISTRIBUTION OF *VARILLA MEXICANA*: VAR. *MEXICANA* (•); VAR. *GYPSOPHILA* (○).

DISTRIBUTION (Figure 2): west central Coahuila, mostly gypseous alluvial or sand blown soils, 700-1400 m; flowering all seasons.

The taxon is largely confined to gypseous soils, being especially common on the gypseous dunes in the vicinity of Cuatro Ciénegas. As indicated in Figure 2, the two varieties are not known to occur together, but an occasional intermediate between the two taxa may be found, although most such plants are probably late flowering specimens of var. *gypsophila* in which the leaves of secondary shoots become narrower, or else these are late flowering specimens of var. *mexicana* in which the heads become somewhat smaller and possess somewhat shorter, less pubescent achenes.

REPRESENTATIVE SPECIMENS: MÉXICO. Coahuila: Bacon & Leverich 1258 (TEX); Chiang, et al. 9511c (LL); Gieschen s.n. (TEX); Henrickson 6027 (LL); Henrickson 12108 (LL); Henrickson 12224 (LL); Henrickson 12254 (LL); Henrickson 12513 (LL); Henrickson 12550 (LL); Henrickson & Lee 15904 (TEX); I.M. Johnston 7819 (GH); I.M. Johnston 8690 (GH, LL); M.C. Johnston, et al. 10337 (LL); M.C. Johnston, et al. 10349 (LL); M.C. Johnston, et al. 10375 (LL); M.C. Johnston, et al. 12163 (LL); M.C. Johnston, et al. 12178 (LL); Leverich & Turner 1 (TEX); Marroquin 1087 (TEX); Nesom, et al. 5237 (TEX); Pinkava 5260 (LL); Powell & Turner 2239 (TEX); Purpus 4463 (GH); Stewart 2657 (GH); Turner 6195 (TEX); Wendt & Lott (LL).

*Varilla mexicana* A. Gray var. *mexicana* Figure 1.

As described in the above account, the variety *gypsophila* not included; chromosome number,  $n = 18$  pairs (Powell & Powell 1977).

DISTRIBUTION (Figure 2): northeastern Durango and closely adjacent southern Coahuila and northwestern Zacatecas, pine-oak-juniper woodlands in calcareous soils, 1300-2000 m; flowering all seasons.

In his description, Gray noted the lectotype to have been collected in the state of Chihuahua. The localities given, however, are both from Durango. Indeed, I have not seen collections of *Varilla mexicana* from Chihuahua, although it occurs close to that state in west central Coahuila.

REPRESENTATIVE SPECIMENS: MÉXICO. Coahuila: González 310 (TEX); Gregg s.n. (GH); Palmer 680 (GH); Pringle 42 (GH, LL); Pringle 310 (TEX); Rodríguez & Carranza 2368 (TEX); Rodríguez & Carranza 2404 (TEX); Shreve & Tinkham 9852 (GH, LL); Thurber 855 (GH). Durango: Flyr 146 (TEX); M.C. Johnston, et al. 10991 (LL); Powell & Turner 1867 (TEX); Turner 15049 (TEX). Zacatecas: M.C. Johnston, et al. 11521 (LL).

*Varilla tezana* A. Gray, *Pl. Wright.* 1:133. 1852. Figure 3. TYPE: UNITED STATES. Texas: "Saline plains, from the Nueces to the Rio Grande, Texas; Sept." Wright s.n. (LECTOTYPE (selected here): GH!).





FIG. 3. VARILLA TEXANA (LEVERICH 22, TEX).

In the protologue a collection by M. Trecut from the same district is also cited; I have designated the Wright collection as lectotype.

Low succulent shrublet to 50 cm high, the stem sarcose and recumbent; leaves narrowly terete, succulent, 15-30 mm long, 0.5-1.5 mm wide; heads solitary, terminal, on peduncles 10-20 cm long; receptacles ovoid, 1.8-2.0 times as long as wide (ca. 9 mm high, 4-5 mm wide); disk florets 200+; achenes columnar, black, epappose; chromosome number,  $n = 18$  pairs (Powell & Turner 1963).

A very distinct species often forming relatively "pure" stands in saline river bottoms. The species has been amply described by a number of workers.

DISTRIBUTION (Figure 4): Southernmost Texas and adjacent northern México in saline flats, 10-200 m; flowering all seasons.

REPRESENTATIVE SPECIMENS: UNITED STATES. Texas: Dimmit Co., *Correll & Johnston* (LL). Hidalgo Co., *Clover* (LL). Maverick Co., *Seigler, et al.* 1401 (TEX). Starr Co., *Wood* 745 (TEX). Webb Co., *Correll & Johnston* 19744 (LL). Zapata Co., *Correll* 35441 (LL). Zavala Co., *Shinners* 7386 (LL).

MÉXICO. Nuevo León: *Barkley* 14350 (LL); *Garcia* 75 (TEX); *Johnston* 4361 (TEX), *Johnston* 5012 (TEX); *Johnston & McMillan* 6070 (TEX); *Johnston & McMillan* 6072 (TEX); *Leverich & Turner* 22 (TEX); *Nesom* 6815 (TEX); *Smith* M644 (TEX). Tamaulipas: *Heard* 4 (LL, TEX); *Johnston* 4340 (TEX).

#### ACKNOWLEDGMENTS

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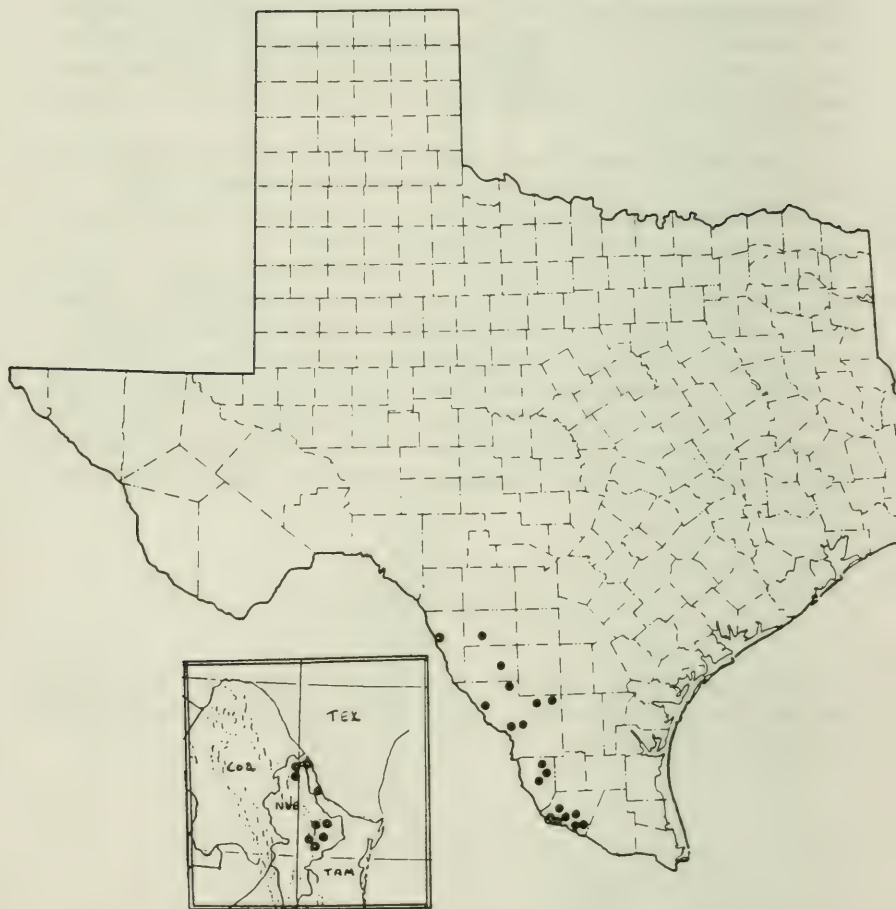


FIG. 4. DISTRIBUTION OF *VARILLA TEXANA* IN TEXAS AND IN MEXICO (INSET).



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## NEW SPECIES, NAMES, AND COMBINATIONS IN MEXICAN ASTERACEAE

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### ABSTRACT

The following new species, names and combinations of Mexican Asteraceae are proposed: *Brickellia oligadenia* (B.L. Robins.) B. Turner, *stat. nov.*; *Helianthus petiolaris* Nutt. var. *fallax* (Heiser) B. Turner, *comb. nov.*; *Helianthus praecox* Engelm. & A. Gray var. *runyonii* (Heiser) B. Turner, *stat. nov.*; *Hemizonia Greeneana* Rose var. *peninsularis* (Moran) B. Turner, *stat. nov.*; *Hymenoxys ursina* (Standl.) B. Turner, *comb. nov.*; *Iva ambrosiifolia* (A. Gray) A. Gray var. *lobata* (Rydb.) B. Turner, *comb. nov.*; *Microseris Douglasii* (DC) Schultz-Bip. var. *platycarpa* (A. Gray) B. Turner, *stat. nov.*; *Otopappus pittieri* (Greenm.) B. Turner, *comb. nov.*; *Perymenium fayi* B. Turner, *spec. nov.*; *Pseudogynoxys chenopodioides* (H.B.K.) Cabrera var. *cunningii* (Benth.) B. Turner, *comb. nov.*; *Viguiera superaxillaris* (S.F. Blake) B. Turner, *comb. nov.*; *Zinnia angustifolia* H.B.K. var. *littoralis* (B.L. Robins. & Greenm.) B. Turner, *comb. nov.*; *Zinnia maritima* H.B.K. var. *palmeri* (A. Gray) B. Turner, *comb. nov.*

KEY WORDS: Asteraceae, México, *Brickellia*, *Helianthus*, *Hemizonia*, *Hymenoxys*, *Iva*, *Microseris*, *Otopappus*, *Perymenium*, *Pseudogynoxys*, *Viguiera*, *Zinnia*.

Preparation of a treatment of the Asteraceae for México (Turner & Nesom, in prep.) has necessitated the following new species, names, and combinations.

***Brickellia oligadenia*** (B.L. Robins.) B. Turner, *comb. nov.* BASIONYM: *Brickellia squarrosa* (Cav.) B.L. Robins. var. *oligadenia* B.L. Robins., Mem. Gray Herb. 1:92. 1917.

McVaugh (1984) followed Robinson (1917) in treating this as a variety of *Brickellia squarrosa* (Cav.) B.L. Robins. (*nom. illegit.*;  $\equiv$  *B. cavanillesii* [Cass.] A. Gray), to which it is certainly related. He noted, however, the geographical isolation of the taxon and the several characters that mark it, all

of which suggest that it is worthy of specific rank. It is readily distinguished from *B. cavanillesii* by its larger, eglandular heads, appressed, more scarious involucre bracts and larger, longer petioled, leaves. It also approaches *B. argyrolepis* B.L. Robins. and occasional specimens with eglandular peduncles might be mistaken for that taxon.

***Helianthus petiolaris* Nutt. var. *fallax* (Heiser) B. Turner, *stat. nov.* BASIONYM: *Helianthus petiolaris* Nutt. subsp. *fallax* Heiser, *Rhodora* 60:279. 1958.**

***Helianthus praecox* Engelm. & A. Gray var. *runyonii* (Heiser) B. Turner, *stat. nov.* BASIONYM: *Helianthus debilis* Nutt. subsp. *runyonii* Heiser, *Madroño* 13:161. 1956.**

Heiser (Heiser, *et al.* 1969) subsequently placed this taxon as a subspecies under *Helianthus praecox* Engelm. & A. Gray.

***Hemizonia greeneana* Rose var. *peninsularis* (Moran) B. Turner, *stat. nov.* BASIONYM: *Hemizonia greeneana* Rose subsp. *peninsularis* Moran, *Trans. San Diego Soc. Nat. Hist.* 15:286. 1969.**

***Hymenoxys ursina* (Standl.) B. Turner, *comb. nov.* BASIONYM: *Actinea ursina* Standl., *Field Mus. Publ. Bot.* 22:126. 1940.**

***Iva ambrosiifolia* (A. Gray) A. Gray var. *lobata* (Rydb.) B. Turner, *stat. nov.* BASIONYM: *Cyclachaena lobata* Rydb., *N. Amer. Fl.* 1:3310. 1972.**

This variety is largely confined to the montane regions of eastern México (type from near Monterrey, Nuevo León); westward it grades into the var. *ambrosiifolia* (type from trans-Pecos, Texas, U.S.A.). Jackson (1960) treated these regional taxa as subspecies under *Iva ambrosiifolia*; the supravarietal classification seems unwarranted considering the degree of morphological intergradation observed in regions of peripheral allopatry.

***Microseris douglasii* (DC.) Schultz-Bip. var. *platycarpa* (A. Gray) B. Turner, *stat. nov.* BASIONYM: *Calais platycarpa* A. Gray, *Pacific RR. Rep.* 4:113. 1857.**

Chambers (1955) treated the present taxon as a subspecies of *Microseris douglasii*, noting its localized occurrence in southernmost California and adjacent Baja California, México.

***Otopappus pittieri* (Greenm.) B. Turner, *comb. nov.* BASIONYM: *Zexmenia pittieri* Greenm. in W.W. Jones, *Proc. Amer. Acad. Arts* 41:156. 1905.**



Villaseñor & Strother (1989) erected the monotypic genus *Tuztla* to accommodate this species. In spite of their reasoned treatment which included comparisons with species of *Otopappus*, *Zexmenia*, and *Verbesina*, I find their phenogram showing the relative isolation of this species unconvincing. Until its position can be established with more certainty, it would appear more prudent to position this within *Otopappus* where I perceive its immediate relationships.

*Perymenium fayi* B. Turner, *spec. nov.* TYPE: MÉXICO. Sinaloa: along highway 40, 53 mi NE of Mazatlán, on side of mountain, 10 Sep 1965, Raymond C. Jackson 7230 (HOLOTYPE: TEX).

*Perymenium pringlei* B.L. Robins. & Greenm. *similis sed foliis minute strigillosis in paginis inferis, capitulis majoribus, et bracteis involucri luteo-scariosis differt.*

Shrubs to 1-2 m high. Stems (upper) tetragonal, deeply grooved on each side, strigose. Leaves ovate lanceolate to linear lanceolate, 6-14 cm long, 0.5-3.0 cm wide; petioles 2-10 mm long; blades trinervate from or somewhat above the base, green and sparsely to moderately appressed strigose below, the margins remotely serrate. Heads campanulate, ca. 10 mm high, 8-10 mm wide (excluding rays) arranged terminally in 4-8 flowered, subfasciculate corymbs, the ultimate (mature) peduncles mostly 3-5 cm long. Involucres 3-4 seriate, graduate, 6-8 mm high, the innermost bracts broad, yellowish, only sparsely ciliate. Receptacular pales 5-7 mm long. Ray florets mostly 8, the ligules yellow, 8-12 mm long, 2-3 mm wide. Disk florets 20-30; corollas 5.5-6.5 mm long, the lobes hispidulous. Anthers brown, the appendages white. Achenes 3.5-4.0 mm long, ca. 2 mm wide, wingless, ciliate along the margins, the pappus of ca. 30 deciduous bristles, mostly 2-3 mm long.

ADDITIONAL SPECIMENS EXAMINED: MÉXICO. Sinaloa: 3.5 mi SW of El Palmito, highway 40, ca. 6000 ft, 8 Nov 1964, D. Flyr 307 (TEX); 53 mi NE of Mazatlán, 10 Sep 1965, Jackson 7233 (TEX).

The holotype has narrowly lanceolate leaves and is superficially markedly different from the other two collections cited, the latter having ovate leaves. Nevertheless all are very similar as to vestiture and details of head and floret structure. While compared with *Perymenium pringlei*, the present species might ultimately find its closest relationship with *P. hintonii* McVaugh of Michoacán and adjacent state of México; both of the latter species possess similar large heads with large florets, but *P. fayi* has leaf blades acute to obtuse at the base and the vestiture is strictly appressed strigillose throughout with very short hairs.

It is a pleasure to name this species for Dr. John J. Fay, in recognition of his scholarly treatment of this difficult genus.

***Pseudogynoxys chenopodioides*** (H.B.K.) Cabrera var. ***cunningii*** (Benth. ex Oerst.) B. Turner, *comb. nov.* BASIONYM: *Gynoxys cunningii* Benth. ex Oerst., Kjoeb. Vidensk. Med. Dask. Nat. Foren. 1852:106. 1852.

Robinson & Cuatrecasas (1977) treated this widely distributed taxon at the specific level within *Pseudogynoxys*. It appears to be exceedingly close to *P. chenopodioides*, distinguished primarily by its pubescent foliage. Only a single collection is known from México (Oaxaca, 32 km N of Puerto Escondido, Martínez, et al. 2720; MEXU, TEX), although the variety is common from Guatemala southwards to Colombia. The var. *chenopodioides* is largely confined to the Gulf slopes of México. One might make a case for the inclusion of var. *cunningii* as an infraspecific category of *P. haenkei* (DC.) Cabrera, the only other species of *Pseudogynoxys* native to México, but I think its relationship is closer to *P. chenopodioides*. Detailed monography may ultimately show that all of these are but allopatric regional units of a very variable *P. cordifolia* (Cass.) Cabrera.

***Viguiera superaxillaris*** (S.F. Blake) B. Turner, *comb. nov.* BASIONYM: *Hymenostephium superaxillare* S.F. Blake, Proc. Biol. Soc. Washington 37:57. 1924.

The type of this species (US!) is given as "La Bojada, Tamazula, Durango, México, altitude 300-600 m, Nov. 1921, by J.G. Ortega (no. 4437)." Blake positioned the species in *Hymenostephium* (which I consider to be part of *Viguiera*, as do Robinson [1981] and McVaugh [1984]), noting that it was nearest to the widespread, highly variable *V. cordata* S.F. Blake of Blake (1918) where it does not appear to have any close relatives. This is discussed in more detail in Turner (1987) where I needlessly described *Viguiera vorobikae* B. Turner, which is clearly a synonym of the present taxon.

***Zinnia angustifolia*** H.B.K. var. ***littoralis*** (B.L. Robins. & Greenm.) B. Turner, *comb. nov.* BASIONYM: *Zinnia littoralis* B.L. Robins. & Greenm., Proc. Amer. Acad. Arts 32:16. 1896.

This taxon, which is largely confined to the coastal areas about Mazatlán, Sinaloa, was maintained at the species level by both Torres (1963) and Strother (1979). In my opinion it is a localized coastal ecotype of the widespread *Zinnia angustifolia*, with which it appears to intergrade. Strother distinguished the latter (in key form) from *Z. littoralis* by the color of receptacular bracts ("stramineous to tip" in *Z. littoralis* vs. "metallic yellow to bright, coppery orange distally"), but I do not find these compelling distinctions; in nearly all other characters it is like *Z. angustifolia*, the most obvious distinction being the somewhat larger heads and shorter, broader leaves in *Z. littoralis*.

***Zinnia maritima*** H.B.K. var. ***palmeri*** (A. Gray) B. Turner, *comb. nov.*  
BASIONYM: *Zinnia palmeri* A. Gray, Proc. Amer. Acad. Arts 22:423.  
1886.

As indicated by McVaugh (1984), *Zinnia maritima* is distinguished from *Z. palmeri* by its "somewhat woody or almost shrubby" habit and petiolate leaves which are "rounded to acute at base and the blades sometimes elliptic." Such plants grade into what Strother (1979) accepts as *Z. palmeri*, although both Torres (1963) and McVaugh (1984) treat the two taxa as synonymous. I agree with Strother (1979) that "in spite of considerable morphological variation, two distinct modes are discernible and distinguishable." In short, typical var. *maritima* appears to be a coastal ecotype of the widespread allopatric var. *palmeri*, the former presumably confined to coastal regions from Acapulco, Guerrero northwards to Jalisco; the latter is largely a taxon of the more interior montane habitats. This relationship is similar to that noted for *Z. angustifolia* var. *littoralis* and *Z. a.* var. *angustifolia*, the former being a coastal ecotype, the latter being a more widespread montane element.

#### ACKNOWLEDGMENTS

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NEW SPECIES, NAMES, AND COMBINATIONS IN MEXICAN *BIDENS*  
(ASTERACEAE: COREOPSIDEAE)

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ABSTRACT

In the preparation of a taxonomic treatment of *Bidens* for México we have found it necessary to describe three new species: *B. balsana* T. Melchert (from Guerrero), *B. oaxacana* T. Melchert (from Oaxaca), and *B. saltillensis* T. Melchert (from Coahuila); two new varieties: *B. aequisquama* (Fern.) Sherff var. *guanajuatensis* T. Melchert (from Guanajuato) and *B. sharpii* (Sherff) T. Melchert var. *tamazulapana* T. Melchert (from Puebla and Oaxaca); four new specific combinations: *B. cronquistii* (Sherff) T. Melchert, *B. hintonii* (Sherff) T. Melchert, *B. pueblensis* (Sherff) T. Melchert, and *B. sharpii* (Sherff) T. Melchert; and four new varietal combinations: *B. acrifolia* Sherff var. *langlassei* (Sherff) T. Melchert, *Bidens chiapensis* Brandegees var. *feddemana* (Sherff) T. Melchert, *comb. nov.* *B. odorata* Cav. var. *rosea* (Schultz-Bip.) T. Melchert, and *B. schaffneri* (A. Gray) Sherff var. *wrightii* (A. Gray) T. Melchert. When appropriate, the relationships of these various taxa are discussed. Especially noteworthy is the treatment of *B. cronquistii* and *B. hintonii*, both of which were originally positioned in the genus *Coreocarpus*, and *B. acrifolia* var. *langlassei* which is transferred from *Cosmos*.

KEY WORDS: Asteraceae, Coreopsidae, *Bidens*, *Coreocarpus*, México.

The senior author and several of his former students have conducted extensive cytotaxonomic and comparative flavonoid studies within and among the more difficult genera of the Mexican and Central American Coreopsidae (*Cosmos*, Melchert 1967, 1968; *Dahlia*, Sorensen 1969; Giannasi 1972; *Coreopsis*, Crawford 1969; *Bidens*, Hart 1973, Ballard 1975, Roseman 1986; and *Thelesperma*, Melchert 1963). The broad taxonomic overview gained through this

combination of studies, which were largely based upon populationally oriented research, augmented by experimental studies on greenhouse grown plants, has resulted in systematic treatments of the genera *Bidens*, *Cosmos*, and *Thelesperma*. In order that the revised concepts might be incorporated into the junior author's concept of these genera for the Asteraceae of México (Turner & Nesom, in prep.), the necessary new species descriptions, new names and new nomenclatural combinations are presented here. More detailed morphological, chromosomal, flavonoid and experimental crossing data relating to these will be published later.

***Bidens acrifolia* Sherff var. *langlassei* (Sherff) T. Melchert. *comb. nov.***  
 BASIONYM: *Bidens langlassei* Sherff, Bot. Gaz. (Crawfordsville) 64:24.  
 1917.  $\equiv$  *Cosmos langlassei* (Sherff) Sherff, Field. Mus. Publ. Bot. 8:425.  
 1932.

ADDITIONAL SPECIMENS EXAMINED (OTHER THAN THE TYPE):  
 MÉXICO. Guerrero: Distr. Mina, Guayameo-Filo, oakwoods, 1240 m, 12 Sep  
 1936, *Hinton, et al.* 9388 (G, MICH, NY, US).

Sherff, in his original description, correctly positioned this taxon in *Bidens*. He later transferred it to *Cosmos* because its general habit was "more that of a *Cosmos* than *Bidens*," an arrangement which Sherff (1955) retained in his treatment for the North American Flora. Since a meaningful analysis of the characteristics distinguishing *Cosmos* and *Bidens* would require detailed comparisons of their flavonoid chemistries, such a discussion cannot be fully undertaken here. At a morphological level suffice it to note that: (1) Many *Bidens* species (e.g., *B. pilosa* L., *B. odorata* Cav., *B. mollifolia* Sherff, *B. pringlei* E. Greene, etc.) characteristically bear square or tetragonal stems, whereas only terete stems are known in *Cosmos*; 2) while linear-tetragonal achenes are basic in both genera, only those of *Bidens* display 3 or more, nearly equally developed, elongated ribs on each face; and 3) while the filaments of *Bidens* are glabrous and somewhat elastic (i.e., readily stretched by the emerging style branches), those of *Cosmos* are invariably pilose and relatively inelastic. Since *Cosmos langlassei* has all of the traits characteristic of *Bidens*, there is little doubt that it is properly positioned in *Bidens*. Moreover, "*Cosmos*" *langlassei* is morphologically all but indistinguishable from *B. acrifolia* Sherff (including *B. polyglossa* Sherff) both of which Sherff himself correctly positioned within *Bidens* (1955; 1964). All have sharply squared stems arising from a short woody crown; well spaced, deeply 2-3 pinnatisect leaves that are broadly triangular in outline; distinctive heads with 8-12 narrowly oblanceolate, two toned yellow rays subtended by (8-)11-16 narrowly linear-subulate outer involucre bracts; exaristate, linear-tetragonal achenes (some with 2 tiny smooth or weakly barbed awns), the innermost of which becomes purplish brown and slightly recurved apically (when mature). Indeed,

the only characters which distinguish between *Bidens acrifolia* (including *B. polyglossa*) and "*Cosmos*" *langlassei* are leaflet size and shape, and stem/leaf pubescence patterns as follows:

1. Ultimate segments linear oblanceolate to 2.5 mm wide; stems with scattered appressed hairs, especially above; the leaves obscurely hispidulose ..... var. *acrifolia*
- 1' Ultimate segments narrowly linear to linear filiform, 0.5-0.8(-1.0 mm) wide throughout; stems glabrous and leaves much more remotely pubescent ..... var. *langlassei*

Given the fact that leaf dissection patterns are generally highly variable in *Bidens* (3-5 partite and 2-3 pinnatisect leaves commonly segregating within single populations), var. *langlassei* may ultimately prove to be nothing more than a narrow leafleted, nearly glabrous form of *B. acrifolia*. However, since var. *langlassei* is known definitely only from southwestern Guerrero (and perhaps adjacent Michoacán), with var. *acrifolia* occurring in Jalisco, Sinaloa, and Durango, I have chosen to treat them provisionally as geographical variants of a single species.

The chromosome number of var. *acrifolia* is  $n = 10$ , a relatively uncommon number in *Bidens* (reported as *B. polyglossa*); that of var. *langlassei* is, unfortunately, unknown.

***Bidens aequisquama*** (Fern.) Sherff var. ***guanajuatensis*** T. Melchert, var. nov. TYPE: MÉXICO. Guanajuato: Route 110, 8.6 mi E of Cd. Guanajuato, near km 87, locally abundant in undisturbed areas of oak covered hillside, 11 Oct 1971, Melchert, Ballard & Hart 71-94 (HOLOTYPE: TEX; Isotype: MEXU).

*Bidens aequisquamae* (Fern.) Sherff var. *aequisquamae* similis sed caulibus singulis (vs. fasciculatis), foliis 3(-5) pinnatisectis, segmentis lanceolati-ovatis pubescentibus, in superficiebus ambabus, et involucrium bracteis exterioribus plerumque 7-10 (vs. 11-13).

ADDITIONAL SPECIMEN EXAMINED: MÉXICO. Guanajuato: Mpio. de Dolores Hidalgo, 8-10 km above (northeast of) Santa Rosa, steep slopes in oak forest, red clay soil with abundant humus cover, 2500-2600 m, 17 Sep 1967, McVaugh 23954 (MICH).

In addition to the characters referred to in the above diagnosis, var. *guanajuatensis* possesses weakly trimorphous achenes, i.e., though mostly black, linear-subtetragonal and biaristate as in var. *aequisquama*. several achenes near the periphery of each head are 4.0-5.5 mm long and bear prominent yellow ribs (2 lateral, 1 ventral and sometimes 1 dorsal), plus scattered small yellow



papillae on the blackish, inter-rib areas, such achenes occur just interior to shorter (3.5-4.0 mm long), totally yellow, linear-clavate, peripheral achenes of the fruiting heads (similar yellow peripheral achenes have been observed in a few individuals from var. *aequisquama* populations).

It is entirely possible that var. *guanajuatensis* is a distinct species. In addition to its obvious relationship to var. *aequisquama*, its overall habit also suggests a close relationship to the large rayed forms of *Bidens mollifolia*, which occur in the states of Michoacán, Jalisco, and México. Although plants of the *B. mollifolia* complex develop diagnostic small, black, epappose, clavate or linear-clavate achenes, studies by the senior author have shown that it is common for a few achenes in totally mature fruiting heads of *B. mollifolia* to develop yellow papillae or small irregular, yellow, calluslike marginal ridges. Other than being epappose, such *B. mollifolia* achenes are rather similar to the short yellow outer, but biaristate achenes seen in var. *guanajuatensis*. Additional study is needed.

***Bidens balsana*** T. Melchert, *spec. nov.* TYPE: MÉXICO. Guerrero: Low mountains 7.4 mi east of Chilpancingo on the road to Tixtla, plants along roadcuts in dry hilly area with small oak, "annual-like" plants with awned achenes and yellow rays with or without a red basal anthocyanin spot (as in 206 A); or awnless perennial plants (as in 206 B); or single awned, seemingly perennial plants (as in 206 C), 21 Oct 1971, Melchert, Ballard & Hart 206 (HOLOTYPE: TEX; Isotype: MEXU).

*Bidens serrulata* (Poir.) Desf. var. *sharpii* Sherff similis sed differt plantis perennibus (vs. annuis) et involucriorum bracteis interioribus moderate vel dense puberulis (vs. glabris).

Erect perennials 80-100(-160) cm tall, arising from a short rhizome, often multibranched from the base. Stems terete, mostly glabrous, but some with scattered pilose hairs near the base (glaucous and totally glabrous in the greenhouse). Leaves either tripartite with deeply toothed, ovate segments, or deeply and evenly 2-3 pinnatisect with numerous lance-linear segments (involute and appearing subfiliform when growing under very dry conditions), the primary segments at right angles to the midrib. Heads radiate, numerous, 4-5 cm across the expanded rays, each with a tuft of hairs at its base. Ray florets mostly 5 per head. Ligules two toned yellow with a distinctive irregularly shaped, maroon-red anthocyanin spot at their base, mostly 20-22 mm long, 8-11 mm wide, the red spot varying considerably in size, essentially absent in some individuals. Outer involucre bracts (9-)11-15, narrowly linear, 4-6 mm long, 0.3-0.4 mm wide, ciliate. Inner bracts moderately pubescent. Disc florets numerous, yellow with a red spot just above the tube. Pales narrowly linear, rounded apically, reddish brown above, becoming white with stripes below. Achenes dimorphous, several of the peripheral ones in each head subclavate,

3.5-6.8 mm long, at first olivaceous, but becoming yellowish or rubrocastaneous; inner achenes blackish, narrowly linear-tetragonal. 6-9(-11) mm long, tapering slightly toward both ends. short setose apically, exaristate, or the innermost with 1 or 2 short awns. Chromosome number,  $n = 11$  pairs.

ADDITIONAL SPECIMENS EXAMINED: MÉXICO. Guerrero: 4.2 mi E of Chilpancingo on road to Chilapa, 21 Sep 1967, *Melchert, Crawford, & Averett 67-154* (IA, TEX); north slope of Cerro Alquitran, 10-14 km by road W of Mex. highway 95 and Mazatlán. granitic rocks, 2250-2450 m, 6 Dec 1966, *Anderson & Laskowski 4405* (F, G, MICH); Cerro Alquitran, Mpio. de Chilpancingo, 2250 m, 6 Dec 1966, *Rzedowski 23637* (MICH).

This species closely resembles *Bidens sharpii* (Sherff) T. Melchert var. *sharpii* (also  $n = 11$ ), but is distinguished by its perennial habit and densely puberulent inner involucre bracts. Known only from two sites in Guerrero (Chilpancingo area); the two collections from Cerro Alquitran all with tripartite leaves and distinct red basal spots on their rays; those from the type locality with 2-3 pinnatisect leaves and ligules with or without the red basal spot. At the latter site, an extremely steep roadcut, some of the plants appeared annual-like (perhaps slow growing), while some were definitely perennial. Interestingly, the type of the annual, *B. sharpii*, the only collection of this annual species from Guerrero, is also from this area (near Omitelmi).

***Bidens chiapensis* Brandegees var. *feddemana* (Sherff) T. Melchert, *comb. nov.* BASIONYM: *Bidens feddemana* Sherff, *Brittonia* 16:60. 1964.**

We would also place *Bidens macvaughii* Sherff (*Brittonia* 16:63. 1964) as synonymous with this taxon; as does McVaugh (1984). *Bidens chiapensis* has three geographically based morphological phases. Most collections of this species have been obtained from Chiapas and Guatemala, where all plants examined appear to be sprawling lignescent herbs, the radiate heads of which bear mostly eight, short, pale lemon yellow rays per capitulum. North of the Isthmus of Tehuantepec, the few available collections are all discoid. One collection is known from Oaxaca. Except for having discoid heads, the latter is essentially identical to the Chiapas-Guatemala plants (*i.e.*, appears prostrate and has three awned achenes). In contrast, the discoid plants from Guanajuato, Michoacán (*B. feddemana*), and Jalisco (*B. macvaughii*), are stout, erect shrubs with biaristate achenes. The erect shrubs are distinguished as var. *feddemana*, whereas the prostrate collection from Oaxaca is included here as a discoid form of the usually short rayed var. *chiapensis*. Chromosome numbers from the short rayed, prostrate, Chiapas-Guatemala populations are diploid with  $n = 12$  pairs; those of the discoid populations are unknown.

***Bidens cronquistii* (Sherff) T. Melchert, *comb. nov.* BASIONYM: *Coreocarpus cronquistii* Sherff, *Brittonia* 16:433. 1964.**

Sherff presumably positioned this square stemmed, white rayed, "*Bidens odorata* like" "annual" (Smith, 1981 notes the plant to appear perennial in greenhouse grown material) in *Coreocarpus* because its small, obcompressed, marginally incurved, epappose achenes superficially resemble those of *Coreocarpus*, i.e., have thick, corky wings along their somewhat inrolled lateral margins. In total characters, however, this Guerrero endemic undeniably belongs to *Bidens*, being particularly close to (and perhaps conspecific with) *B. gracillima* Sherff, *B. minensis* Sherff, and *B. oligantha* Brandegee (including *B. anthriscoides* DC. var. *decomposita* Sherff). Like *B. cronquistii*, these are all small headed "*B. odorata* like" plants of the Sierra Madre del Sur with specialized achenes, neutral rays, and strongly dimorphic involucre (not possessing pistillate rays and essentially monomorphous involucre as in more "typical" *Coreocarpus* species).

In a recent biosystematic revision of *Coreocarpus*, Smith (1989) retained *C. cronquistii* (and its close relative *C. hintonii*) in *Coreocarpus*; but quite convincingly showed them to be morphologically and genetically distinct elements within the genus. Speculating on their phylogeny he noted that the plants of this distinct species pair "bear a striking resemblance to some species of *Bidens*," in particular, suggesting a possible relationship with the recently described *B. clavatus* Ballard which, like *B. oligantha*, etc., is yet another specialized member of the *B. odorata* species complex (with clavate achenes). Despite the many features which Smith listed that ally *B. cronquistii* (and *B. hintonii*) to *Bidens* (quadrangular stems, leaf dissection, ligule color, achene shape and chromosome number) he concluded that "their winged achenes, however, keep them in *Coreocarpus*." In our view, the inrolled marginal wings on *B. cronquistii* achenes were most likely developed through the enlargement and coalescence of yellow papillae and/or callus like ridges, such as occur along the introrse margins of many mature achenes of *B. oligantha*, *B. minensis*, and *B. gracillima*. Achenes intermediate between these extreme forms are known: MÉXICO. Guerrero: Temisco, 350 m, 5 Nov 1937; *Mezía* 8748 (F, G, MO, NY, TEX, UC, US).

The transfer of *Coreocarpus cronquistii* and *C. hintonii* to *Bidens*, leaves *Coreocarpus congregatus* (S.F. Blake) E.B. Smith (formerly *Coreopsis congregatus*) as the only somewhat discordant (sterile rayed, dimorphic involucre) element in *Coreocarpus*.

***Bidens hintonii* (Sherff) T. Melchert, comb. nov.** BASIONYM: *Coreocarpus hintonii* Sherff. *Brittonia* 16:58. 1964.

Sherff originally described this species as a *Coreocarpus*, no doubt because all, or at least the outer, achenes in each fruiting capitulum have yellow to brown, corky pectinate wings along their somewhat inrolled lateral margins (the innermost achenes in some heads being much narrower, slightly attenuated and yellowish at the tip, their margins and ventral midribs smooth or with

scattered small tuberculae). In its total characteristics, however, this species is very similar to members of the *Bidens mollifolia* polyploid complex, particularly the populations occurring from the state of México, westward. Like *B. hintonii*, these are square stemmed, white to rose rayed perennials with tiny black epappose achenes hidden among the chaff of the fruiting capitula. While most *B. mollifolia* achenes are clavate to linear clavate and wingless, our studies have shown that in totally mature fruiting heads it is common for a few achenes to develop yellow papillae and/or yellow callus like marginal ridges. It is very likely that the corky wings of *B. hintonii* are essentially an elaboration of the less ornate marginal outgrowths that occur in *B. mollifolia*.

Smith (1989) retained *Bidens hintonii* and *B. cronquistii* in *Coreocarpus*, but noted their morphological and genetic isolation within *Coreocarpus* and their close relationship to certain *Bidens* species (see above discussion under *B. cronquistii*).

*Bidens hintonii* was known to Sherff only by the type, a Hinton collection from Guerrero (Distr. Mina). We have examined an additional collection, as follows: MÉXICO. Guerrero: San Antonio, Montes de Oca, 20 Oct 1937, G.B. Hinton, et al. 11510 (GH, MICH, NY, US). The MICH specimen was inexplicably annotated by Sherff as *B. aequisquama* (Fernald) Sherff. Smith (1989) did not examine the above collection, but cited a recent additional collection from Guerrero, 6 km SE of Guayameo, 820 m, Villaseñor & Soto s.n. (UARK, MEXU).

***Bidens odorata* Cav. var. *rosea* (Schultz-Bip.) T. Melchert, comb. nov.**  
BASIONYM: *Bidens rosea* Schultz-Bip., in Seem. Bot. Voy. Herald 308. 1856.

This is the correct varietal name for what heretofore has been called *Bidens odorata* var. *calvicola* (Greenm.) Ballard ex T. Melchert (1975). Sherff (1955), however, referred the latter name to varietal status under *B. pilosa*. Under the current *Code of Botanical Nomenclature* (1988), the varietal name *rosea* was automatically created with the publication of *B. rosea* var. *calvicola* Greenm. (1905); under article 26.2 of the present Code, the correct name should be var. *rosea*.

***Bidens oaxacana* T. Melchert, spec. nov.** TYPE: MÉXICO. Oaxaca: Route 190, 39.8 mi SE of Totolapan (15.9 mi NW of Río Hondo bridge and 8.2 mi SE of El Camarón, adjacent to small roadside chapel; plants scattered on rather open dry, oak-pine covered hillsides, 18 Oct 1971, Melchert, Ballard & Hart 71-166 (HOLOTYPE: TEX; Isotype: MEXU).

*Bidens steyermarkii* Sherff similis sed differt foliis 2-3 pinnatisectis segmentis ultimis lineari-filiformibus et acheniis minutis nigris sin pappo.



A rather small, often somewhat tufted, rhizomatous perennial with small, white rayed heads, young plants easily mistaken for annuals. Stems decidedly square. Leaves deeply 1-2 pinnatifid with linear filiform segments, these only 0.5-1.0 mm wide. Flowering heads with ca. 5 tiny white rays, these 4-5 mm long, obovate, apically truncated. Disc florets yellow. Fruiting capitula with numerous tiny, clavate achenes, these only 2.5-4.0(-5.0) mm long, black, glabrous, epappose, hidden by the pales. Chromosome number,  $n = 12$  pairs.

ADDITIONAL SPECIMEN EXAMINED: MÉXICO. Oaxaca: ca. 105 km WNW of Tehuantepec, ca. 65 km SE of Totolapan, ca. 1300 m, 6 Nov 1970, *Cronquist & Fay 1-880* (IA, NY).

While other square stemmed, white rayed species of *Bidens* have small, clavate, epappose achenes (*B. mollifolia*, *B. clavata* Ballard, and *B. steyermarkii*), *B. oaxacana* is the only Mexican *Bidens* with such fruits, and with deeply bipinnatisect leaves with narrowly linear to linear filiform leaf segments, these mostly 0.5-1.0 mm wide. It's closest relative appears to be *B. steyermarkii*, a poorly known, once-collected species from western Guatemala.

*Bidens pueblensis* (Sherff) T. Melchert, *comb. nov.* BASIONYM: *Bidens bigelovii* A. Gray var. *pueblensis* Sherff, Bot. Gaz. (Crawfordsville) 88:287. 1929.

SPECIMENS EXAMINED: MÉXICO. Jalisco: ca. 28 mi W of Ayutla and ca. 70 mi NW of Autlán, 3 Nov 1963, *A. Cronquist 9743* (MICH, MO, NY, US). Michoacán: 4.5 mi E of Cojumatlán, cliffs overlooking SE shore of Lake Chapala, 7 Oct 1965, *A. Cronquist 10292* (NY). México: route 55, 0.5 mi N of Ixtapan de Sal, 23 Oct 1971, *Melchert, Ballard & Hart 71-288* (IA, TEX). México D.F.: Pedregal de San Angel, Sep 1927, *E. Lyonnet s.n.* (US). Guerrero: Mpio. de Tlacatepec, Cerro Tlacatepec, near village of Agua Fria, ca. 40 km N Coyuca de Benitez, 4 Dec 1963, *R. Feddema 2904* (MICH); Cerro Tlacatepec, near village of Agua Fria, ca. 40 km N Coyuca de Benitez, 4 Dec 1963, *Rzedowski 18134* (MICH). Oaxaca: route 190 ca. 35 mi NW Cd. Oaxaca, 19 Oct 1971, *Melchert, Ballard, Hart 71-185* (IA, TEX); 10 km S of Suchixtepec and 95 km N of Puerto Angel, 8 Nov 1970, *A. Cronquist, J. Fay 10897* (NY, US); Cerro San Felipe, 18 Oct 1908, *C. Conzatti s.n.* (FM). Puebla: Hacienda Batón, vicinity of Puebla, *Bro. G. Arsene s.n.* (US).

While the overall morphology of this taxon is very much like *Bidens bigelovii*, it is distinguished absolutely by the diploid chromosome complement ( $n = 12$ ) and its five, tiny (4-5 mm), two toned yellow rays, each with a minuscule red anthocyanin dot at their base. Whether discoid or short radiate, *B. bigelovii* is always tetraploid ( $n = 24$ ), and the ligules, when present, are either white, white with a red dot, or pale lemon yellow, the rays frequently varying from 2-5 per head within a given population.

*Bidens saltillensis* T. Melchert, *spec. nov.* TYPE: MÉXICO. Coahuila: San Lorenzo Canyon, "5.1 km (3.2 mi) en terraceria de la carretera

Saltillo a Zacatecas (54). 1 hora a pie arriba en el cañon," 2700-2800 m, forest of *Quercus*, *Cupressus*, and *Buddleja*, 18 Aug 1982, Clark P. Cowan 3559 (HOLOTYPE: TEX; Isotype: MEXU).

*Bidens odoratae* Cav. var. *rosea* (Schultz-Bip.) T. Melchert  
similis sed differt duratione perenni (vs. annui) et caulibus teretibus  
(vs. quadratis).

Perennial herbs 20-40 cm high. Stems glabrous or nearly so, seemingly terete (not clearly 4 sided), arising from a twisted, cordlike rhizomatous root (root present on only one specimen. Leaves simple or 3-4 parted, 3-8 cm long, the divisions linear lanceolate, mostly 2-4 mm wide, glabrous and entire (rarely a few marginal hispidulous hairs). Heads radiate, mostly 1-3 per stem, the ultimate peduncles 5-8 cm long. Involucres 5-6 mm high, the inner series purple, glabrous, the margins prominently white scarious, the outer series with mostly eight lanceolate, ciliate bracts 3-4 mm long. Receptacular bracts about as long as the florets, similar to the inner involucre bracts but linear lanceolate and narrowly acute. Ray florets 3-5, neuter, sterile (rarely a few reduced stamens or style branches), the ligules 9-11 mm long, 5-7 mm wide, white with 6-8 rosaceous veins. Disk florets 12-20, the corollas yellow, ca. 5 mm long, the lobes markedly short papillose pubescent. Anthers purplish brown with yellow appendages. Achenes (somewhat immature) linear, 8-12 mm long, brown, hispidulous, tetragonal below, somewhat tapering above, the pappus of mostly 2 awns 0.5-1.0 mm long, sometimes deciduous or absent.

ADDITIONAL SPECIMEN EXAMINED: MÉXICO. Coahuila: from above location at the same date, Cowan 3565 (MEXU, TEX); mountains near Saltillo, 3 Sep 1948, J. Greg 438 (G, MO).

The species superficially resembles the white rayed annual, *Bidens odorata* var. *rosea*, but differs markedly because of its perennial habit and nearly terete stems and 3-5 rayed heads. Indeed, it is the only white rayed perennial *Bidens* known to have terete stems.

*Bidens schaffneri* (A. Gray) Sherff var. *wrightii* (A. Gray) T. Melchert,  
comb. nov. BASIONYM: *Bidens heterophylla* Ortega var. *wrightii* A.  
Gray. Proc. Amer. Acad. Arts 19:16. 1883.

ADDITIONAL SPECIMENS EXAMINED: MÉXICO. Chihuahua: 2 mi N of Madera, plants in moist ditch and adjacent cultivated fields, 2 Sep 1966, Melchert, Sorensen, & Crawford 6270 B (leaves deeply pinnatisect); 2 mi N of Madera, plants in moist ditch and adjacent cultivated fields, 2 Sep 1966, Melchert, Sorensen, & Crawford 6270 A (leaves linear lanceolate) (IA, TEX); ca. 10 mi N of Madera, above village of Bravo on west edge of Lago de Babicora, 1 Sep 1966, Melchert, Sorensen, & Crawford 6261 (IA, TEX).

This taxon (which also includes *Bidens insolita* Sherff) has long resided in synonymy under *B. aurea* (Ait.) Sherff and was so treated by Sherff (1955) in his treatment for the North American Flora. While *Bidens aurea* is mostly tetraploid with  $n = 23$  pairs of chromosomes, *B. schaffneri* var. *schaffneri* and var. *wrightii* are both diploid with  $n = 11$  pairs. The latter variety, which occurs mainly in central Chihuahua, differs from the more southern, primarily streamside, var. *schaffneri* in possessing simple and/or tripartite leaves with narrowly lanceolate blades, as well as deeply pinnatifid leaves and achenes with barbed pappus awns. In addition, var. *schaffneri* has proven fully compatible with var. *wrightii* in synthetic crosses (Melchert, unpubl.).

***Bidens sharpii*** (Sherff) T. Melchert, *comb. nov.* BASIONYM: *Bidens serrulata* (Poir.) Desf. var. *sharpii* Sherff, Bot. Leaflet. 2:6. 1950.

SPECIMENS EXAMINED: MÉXICO. Oaxaca: route 190 ca. 14 mi S of Nochixtlán, *King 2517* (TEX); along road from Ixtlán de Juárez to Villa Alta, 14 July 1968, *Carman 68-39* (IA, TEX); route 190 ca. 15 mi NW of Yanhuatlán, 14 Sep 1967, *Melchert, Averett, & Crawford 67-64* (IA, TEX); route 175, 21.5 mi N of jct with route 190 just N of El Cerezo, 18 Oct 1971, *Melchert, Ballard, & Hart 71-179* (IA, TEX); route 190 31.5 NW of Cd. Oaxaca, 19 Oct 1971, *Melchert, Ballard, & Hart 71-186* (IA, TEX); route 190 128 mi SE of Tamazulapan, 20 Oct 1971, *Melchert, Ballard, & Hart 71-201* (IA, TEX).

This taxon, which Sherff misplaced in *Bidens serrulata*, is very common across central Oaxaca (one collection, the type, from central Guerrero). In sharp contrast with *B. serrulata*, which is centered in the state of México, var. *sharpii* mostly possesses a distinctive maroon red anthocyanin blotch at the base of their two toned yellow ligules. The size of this spot varies considerably. Though usually conspicuous, it may be quite small and difficult to see when pressed, or rarely even absent. Regardless of ray color, however, var. *sharpii* can be distinguished by its unique combination of (9-)11-15(-17) narrowly linear outer bracts, glabrous inner bracts (indeed the plant is glabrous throughout, except for a tuft of hairs at the base of each capitulum), and a chromosome number of  $n = 11$ . *Bidens serrulata* has totally yellow ligules (these also two toned but never with a basal red spot), 8 wide, outer involucre bracts, pubescent inner involucre, and a chromosome number of  $n = 12$ .

***Bidens sharpii*** (Sherff) T. Melchert var. ***tamazulapana*** T. Melchert, *var. nov.* HOLOTYPE: MÉXICO. Oaxaca: Mpio. Tamazulapan, Cerro Pericón, al NW de San Pedro Nopala, ca. 2460-2660 m, "Veq. Ecetonia matorral espinoso-encinar. Suelo café rojizo sobre roca ígnea," 21 Oct 1984, *P. Tenorio L. 7882* (HOLOTYPE: TEX; Isotype: MEXU).

*Bidens sharpii* (Sherff) T. Melchert var. *sharpii* arcte similis sed differt bracteis interioribus receptaculi dorsaliter pubescentibus

(vs. *glabris*) et bracteis involucribus ad apices purpuratis, area purpurata 1-2 plo longiore quam latiore.

Much resembling var. *sharpii* but the inner involucrial bracts pubescent dorsally (vs. *glabrous*), the inner receptacular bracts purple apically, the purple area 1-2 times as long as wide.

ADDITIONAL SPECIMENS EXAMINED: MÉXICO. Puebla: Mpio. Caltepec, Maguey Manzo, El Gavilán al NW de San Simón, 3 Oct 1984, *Tenorio L. 7567* (MEXU, TEX); Cerro El Gavilán, SE de Caltepec, 1880-2320 m, 11 Oct 1984, *Tenorio L. 7644* (MEXU, TEX).

The var. *tamazulapana* resembles var. *sharpii*, but has involucrial bracts moderately to densely pubescent with multicellular hairs; interior phyllaries with distinctive jet black tips, these rather sharply delineated basally (not elongated and gradually tapered as in var. *sharpii*); rays with or without the red basal anthocyanin spot (the holotype entirely yellow rayed); some of the disc florets with tiny dark spherical glands on their teeth. It is known only from three recent collections (cited above). While treated here as an isolated variant of *Bidens sharpii*, the combination of "*B. serrulata* like" multicellular involucrial hairs, jet black chaff tips, yellowish anther appendages, tiny dark glands on some of its disc corolla teeth, and its somewhat isolated distribution, suggest that var. *tamazulapana* may very well prove to be a distinct local species. Additional study is needed to affirm its biological status.

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## TWO NEW SPECIES OF MEXICAN *BACCHARIS* (ASTERACEAE: ASTEREEAE)

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### ABSTRACT

Southeastern Mexican populations previously considered to represent *Baccharis heterophylla* Kunth are here recognized as the new species, *B. glandulifera* *spec. nov.* The latter is endemic to Oaxaca and Chiapas, and is allopatric with *B. heterophylla*, now considered to be restricted to central, western, and northwestern México. The type of *B. vaccinioides* Kunth, a name traditionally applied to plants of Chiapas and adjacent Central America, was collected in Hidalgo and is conspecific with *B. conferta* Kunth. Since the southern "vaccinium like" plants have never received a name, they are formally described here as *B. confertoides* *spec. nov.*, an epithet chosen to emphasize their close relationship to *B. conferta*.

KEY WORDS: *Baccharis*, Asteraceae, Astereae, México, Central America.

In connection with taxonomic studies of the Asteraceae-Astereae of México, two aspects of the systematics of *Baccharis* are discussed here in some detail. Hypotheses of the relationships of these taxa in a broader context will be presented in a separate paper (Nesom 1990).

#### I. A new species related to *Baccharis heterophylla*.

*Baccharis glandulifera* Nesom, *spec. nov.* TYPE: MÉXICO. Oaxaca: Mpio. Juquila, Puertecillo de Lachoa, km. 180 carretera Oaxaca-Puerto Escondido, pine-oak woods, 2000 m, 14 Apr 1965, *Rzedowski 19619* [pistillate] (HOLOTYPE: TEX!; Isotype: ENCB). (*Rzedowski 19618* is a staminate specimen from the type locality. *Rzedowski 19617*, also collected at the same locality, is *Baccharis trinervis* Pers.).

*Baccharis heterophylla* Kunth similis sed phyllariis ad apices glandibus fuscatis tumidisque, acheniis minoribus, et pappo setis brevioribus differt.

Glabrous, glutinous shrubs or small trees 1-3(-4.5) m tall. Leaves bright green or yellow green, thick, with sunken resin glands, oblanceolate to oblong oblanceolate, distinctly or obscurely trinerved, with 1-4 pairs of teeth, usually in distal half, infrequently entire, 20-50 mm long, 4-15(-20) mm wide, 3-5 times longer than wide, apex blunt to obtuse, base cuneate or attenuate to a short petiole or petiolar region 1-3 mm long. Heads sessile or subsessile in tight, terminal clusters, campanulate, 4-5 mm wide, 3.5-5.0 mm long; phyllaries of at least the outer series with a dark brown or blackish, sharply delimited, swollen gland on the abaxial apex, stramineous below, margins thin and translucent. Hermaphroditic corollas 4 mm long, pubescent on the limb and upper tube. Pistillate corollas tubular, 2-3 mm long, with fimbriate apical extensions; style branches 0.5 mm long. Achenes 0.8-1.1 mm long, 0.4-0.6 mm wide, 10-11 nerved; mature pappus 4.0-6.5 mm long.

Oaxaca to central Chiapas (Figure 1); pine, pine-oak, or pine woods, disturbed forest of *Alnus*, evergreen forest of *Tazodium* and *Ficus*; 1000-2950 m; flowering December through May (-July).

Representative collections examined: MÉXICO. Chiapas: Mpio. Venustiano Carranza, at NE boundary of Aguacatenango, *Breedlove* 9645 (LL); 5 km N of Ixtapa along road to Soyalo, along the Río Laja, *Breedlove* 35077 (MO, TEX). Oaxaca: San Pablo Macuiltianguis, 10 km from the entrance to la Puerta del Sol, *Calzada* 4975 (TEX); near Oaxaca, Rancho Benito Juárez on road up mountains from Teotitlán de Valle, *Carlson* 1431 (TEX); 2 km S of El Punto on Hwy 175, ca. 30 km N of Oaxaca, *Conrad* 3145 (MO); 37.9 mi S of bridge at Valle Nacional on Hwy 175, *Croat* 48130 (MO); 21 km NE of Ixtlán de Juárez on Hwy 175, *Judziewicz* 3371 (WIS); El Tejocote on Rte 190, *King* 6456 (MO); 20 km NE of Oaxaca on road to Ixtlán, *Marcks & Marcks* 1107 (LL); on road from Ayutla to Zacatepec, 3 km S of turnoff to Zacatepec, *Nee & Martin* 32217 (TEX); between Macuiltianguis and Puerta del Sol, *Ortega O. & Ortiz T.* 1627 (TEX); 20 km NE of Oaxaca, on hwy from Juárez to Ixtlán, *Rzedowski* 19271 (TEX); Cuauhtlilla, 28 Nov 1895, *Seler* 1510 (GH); Rancho de Calderon, 11 Feb 1895, *Smith* 374 (GH); 4.8 km W of Sto. Tomás Ocotepec, *Torres C.* 2176 (MO); 14 km N of Diaz Ordaz, by the detour to Cuajimoloyas, *Torres C.* 2817 (TEX).

*Baccharis glandulifera* has previously been identified as *B. heterophylla*, to which it is most closely related, but the new species is particularly distinctive in its phyllaries with dark, swollen, apical glands. Some plants of *B. heterophylla* may have darkened phyllary apices but never the deep and conspicuous gland pockets of the plants to the south. Additionally, although the measurements are overlapping, the leaves and achenes of the two taxa are different in average size, as noted in the following couplet.

1. Leaves (21-)30-65 mm long, (6-)8-20 mm wide; phyllaries with a prominent, dark, glandular pocket at the abaxial apex; achenes 0.8-1.3 mm

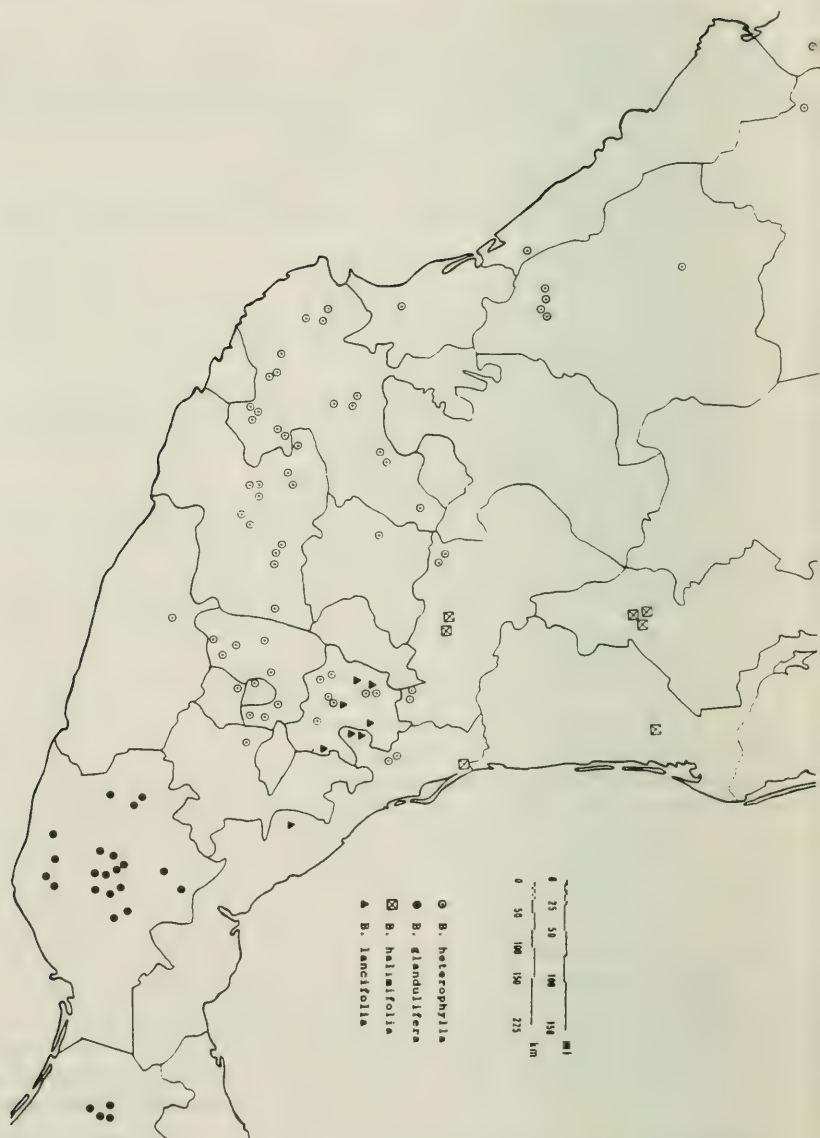


Figure 1. Geographic distribution of *Baccharis heterophylla*, *B. glandulifera*, *B. halimifolia*, and *B. lancifolia*.



long ..... *B. glandulifera*

1' Leaves (20-)25-50 mm long, 4-12 mm wide; phyllaries sometimes darkened at the apex but never with a gland pocket; achenes 1.3-1.6 mm long ..... *B. heterophylla*

All records of *Baccharis heterophylla* from Oaxaca to Chiapas apparently are referable to *B. glandulifera* (Figure 1). I have seen only two collections from Oaxaca that have phyllaries with only weakly developed gland pockets: *Smith 374* and *Seler 1510*. Both of these are apparently from well inside the range of the gland bearing plants, and both have larger leaves and smaller achenes typical of those in the surrounding area. The Seler collection is a damaged branch with a mixture of mature and immature heads.

In order to emphasize their close relationship, these two population systems might be regarded as conspecific and recognized at varietal rank. Nevertheless, since they are sharply distinct morphologically and separated geographically with no region of intergradation, the recognition of both at the rank of species seems justified.

Also mapped on Figure 1 is *Baccharis halimifolia* L., which is morphologically very similar to *B. heterophylla*. *Baccharis halimifolia* typically grows in swampy or lakeside habitats and is at the southwestern most extension of its range in México.

## II. The identity of *Baccharis vaccinioides*.

The population system of plants known as *Baccharis vaccinioides* Kunth, which occurs from Chiapas to Guatemala, Honduras, and El Salvador, has been accepted by most systematists, including Matuda (1957) and Nash (1976) as a distinctive species. Apparently, however, no one has critically considered the location of the type collection or evaluated its identity, because the collection was made in the state of Hidalgo, far north of the range of the plants it traditionally has been associated with. Kunth's description clearly notes that the leaves of *B. vaccinioides* are uninerved and entire or toothed toward the apex of both margins, and the photograph (fiche) of the type specimen confirms this. Thus, given the type locality and the morphology of the plant itself, *B. vaccinioides* must be considered a synonym of *B. conferta* Kunth. The "vaccinium like" plants, which apparently have never been given a name, are formally provided below with a type and epithet.

***Baccharis confertoides* Nesom, spec. nov.** TYPE: MÉXICO. Chiapas: Mpio. San Cristobal Las Casas, E side of Zonthehuitz near summit, evergreen cloud forest, *Drimys*, *Clethra*, *Quercus*, and *Cleyera*, 2800 m,

19 Dec 1972, *D.E. Breedlove 30436* (HOLOTYPE: LL!; Isotypes: CAS, MEXU!).

*Baccharis confertae* Kunth similis sed foliis integris praecipue differt.

Glabrous, glutinous shrubs or small trees 1.0-3.5 m tall. Leaves elliptic to elliptic obovate, entire, uninerved, 10-28 mm long, 6-12 mm wide, punctate, with minutely papillate margins. Heads 3-5 mm wide, 3-4 mm long; phyllaries sometimes with a colored apical portion or rim. Hermaphroditic corollas distinctly pubescent with short, white hairs, at least on the upper tube and lower limb. Achenes 1.1-1.3 mm long; mature pappus 4-5 mm long.

Chiapas (México), to Guatemala, El Salvador, and Honduras (as noted by Nash [1976]) (Figure 2); roadsides, slopes in oak, pine-oak, often with alder, or evergreen cloud forests; 1600-3600 m; December-April.

Representative collections examined: MÉXICO. Chiapas: Mt. Pasitar, 30 Dec 1936, *Matuda 722* (LL).

GUATEMALA. Dept. Totonicapan: near San Francisco El Alto, 12 Jan 1941, *Standley 83137* (LL).

EL SALVADOR. Dept. Chalatenango: near summit of Los Esesmites, 10 Mar 1942, *Tucker 986* (LL).

*Baccharis conferta* Kunth, *Nov. Gen. & Sp. Pl.* 4 [folio]:43. 1818; 4 [quarto]:55. 1820. TYPE: MÉXICO. [Morelos]: near Cuernavaca, Apr [1803], *Humboldt & Bonpland s.n.* (P fiche!, B-WILLD [photo TEX!]).

*Baccharis vaccinioides* Kunth, *Nov. Gen. & Sp. Pl.* 4 [folio]:39. 1818; 4 [quarto]:50. 1820. TYPE: MÉXICO. [Hidalgo]: near Moran, May [1803], *Humboldt & Bonpland s.n.* (P fiche!, photo GH!). Not *B. vaccinioides* Gardn. (1845) from Brazil.

*Baccharis resinosa* Kunth, *Nov. Gen. & Sp. Pl.* 4 [folio]:41. 1818; 4 [quarto]:52. 1820. TYPE: [MÉXICO]: "In America meridionali," no date [1803], *Humboldt & Bonpland s.n.* (P fiche!).

*Baccharis zalapensis* Kunth, *Nov. Gen. & Sp. Pl.* 4 [folio]:44. 1818; 4 [quarto]:56. 1820. TYPE: MÉXICO. [Veracruz]: near Xalapa, Feb [1803], *Humboldt & Bonpland s.n.* (P fiche!).

*Baccharis congesta* DC., *Prodr.* 5:410. 1836. TYPE: MÉXICO. [Hidalgo]: Real del Monte, *Haenke s.n.* (HOLOTYPE: G-DC fiche! [photo TEX!]).

*Baccharis orizabaensis* Schultz-Bip. ex Hemsley, *Biol. Centr. Amer., Bot.* 2:130. 1881. SYNTYPES: MÉXICO. [Veracruz]: Peak of Orizaba, [no date], *Linden 1133* and *Liebmann 353* (K).



Figure 2. Geographic distribution of *Baccharis conferta*, *B. confertoides*, and *B. dioica*.

San Luis Potosí, Michoacán, Guerrero, México, D.F., Hidalgo, Tlaxcala, Morelos, Veracruz, Puebla, Oaxaca (Figure 2); clearings or woods edges, grassy areas, often grazed or recently burned, in areas of pine-oak, pine, pine-fir, or fir woods; (100-)1900-3250 m; February-May.

The two species are separated by the following couplet.

1. Shrubs 0.3-2.0 m tall; leaves mostly obovate-oblongate, with 1-2(-3) pairs of coarse teeth near the apex; phyllaries sometimes with a dark midvein but without a colored apical area or rim ..... *B. conferta*
- 1' Shrubs to small trees 1.0-3.5 m tall; leaves mostly elliptic to slightly oblongate, the margins entire; phyllaries often with a colored apical portion or rim ..... *B. confertoides*

Rare individuals of *Baccharis conferta* produce leaves that are entire or nearly so, but even then, a few other leaves on those plants usually have slightly toothed margins. Even more rare are specimens on which all the leaves are entire, such as *Arsene & Nicolas 5157* (GH), collected in the vicinity of Cd. Puebla. The latter has small, oblongate leaves and was collected in an area from which a number of other specimens with small but typically toothed leaves have been taken. The southeasternmost collection known of *B. conferta* (*Croat & Hannon 65795* [TEX], from the Uxpanapa region of eastern Oaxaca) is morphologically very typical of the species, although at an unusually low elevation, and the distributional disjunction to the south is correlated with an abrupt transition in morphology as well. Further study may show that these closely related taxa are better recognized as varieties of a single species, but such a study should necessarily also account for variation patterns in the related *B. tricuneata* (L. f.) Pers. of South America. Nash (1976) has noted that *B. tricuneata*, which has several varieties (Cuatrecasas 1968), might be conspecific with *B. conferta*. Each of these three taxa, however, occupies a discrete geographic region separate from the others, and it seems more reasonable at present to recognize each as a separate species, while acknowledging their close relationship.

Also mapped on Figures 1 and 2, respectively, are *Baccharis lancifolia* Schlecht. and *B. dioica* Vahl, closely related species that also produce uninnerved, elliptic to oblongate, and entire leaves. The former differs from both *B. conferta* and *B. confertoides* in its much larger leaves with smooth margins and acute apices, and the latter differs in its completely smooth leaf margins, much shorter pappus, and its sandy, coastal habitats.



## ACKNOWLEDGMENTS

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INFRAGENERIC TAXONOMY OF NORTH AND CENTRAL AMERICAN  
*BACCHARIS* (ASTERACEAE: ASTEREEAE)

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ABSTRACT

The 43 *Baccharis* species of the United States, México, and Central America are placed into six sections, based on morphology: sect. *Baccharis* (13 species), sect. *Sergilae* (3 species), sect. *Glandulocarpae* sect. nov. (10 species), sect. *Aristidenthes* sect. nov. (12 species), sect. *Baccharidastrum* (1 species), and sect. *Molinae* (4 species). Taxa with paleate receptacles, previously placed in sect. *Trinervatae*, are here included with the epaleate taxa of sect. *Molinae*. Long disjunctions between North and South America are noted among the species of sect. *Sergilae* and sect. *Baccharidastrum*.

KEY WORDS: *Baccharis*, taxonomy, Astereae, Asteraceae, North America, South America.

The genus *Baccharis* is one of the largest in the Astereae, with approximately 450-500 species, all of which are native to the New World. It is most highly speciose in South America, where about 90% of the species occur and where a great amount of morphological diversity is found. Additional taxa are endemic to the West Indies. Cuatrecasas (1967) outlined the composition of sections named up to that time, and clarified the typification for many of them. Recent taxonomic treatments are available for species of a number of regions of South America, e.g., Colombia (Cuatrecasas 1969), central Argentina (Espinár 1973), and Brazil (Barroso 1976). The author of each of these presented a summary of the relationships among the species in the geographic area under consideration. Espinár, in particular, provided significant information regarding morphological variation among the species groups. Zdero, *et al.* (1986) studied the chemistry of nine Argentinian species, and in a broader view, identified eleven sections in the genus based on the distribution of secondary chemical compounds. An overview of various aspects of the taxonomy and biology of the genus has recently been published (Boldt 1989), but a modern taxonomic summary of the entire genus is lacking.

During the preparation of a taxonomic treatment of the *Baccharis* species of México, it has become clear that they can be placed into relatively few natural groups, based on morphology. The following sectional synopsis accounts for all known North and Central American species: only four species occur in the United States that are not also found in México, and all of the Central American species also occur in México. About fifteen other sections have been identified among the South American species.

*Baccharis* L., *Sp. Pl.* 860. 1753. Type species: *Baccharis halimifolia* L., *typ. cons. prop.* (Hellwig 1989).

1. Section *Baccharis*. Type species: *Baccharis halimifolia* L., *typ. cons. prop.* (Hellwig 1989).

Sect. *Cuneifoliae* DC., *Prodr.* 5:405. 1836. Type species: *Baccharis cuneifolia* (Lam.) DC.

Sect. *Involucratae* Heering in Reiche, *Fl. Chile* 4:17. 1903. Lectotype species (Cuatrecasas 1967): *Baccharis conferta* Kunth, *Nov. Gen. & Sp. Pl.* 4 [folio]:43. 1818; 4 [quarto]:55. 1820. TYPE: MÉXICO. [Morelos]: near Cuernavaca, Apr [1803], *Humboldt & Bonpland s.n.* (P fiche!, B-WILLD [photo TEX!]).

Sect. *Glomeruliflorae* Heering, *Jahrb. Hamburg. Wiss. Anst.* 21:32. 1904. Type species: *Baccharis glomeruliflora* Pers.

Glabrous shrubs or small trees: leaves cuneate to obovate oblong, punctate, not papillate, glutinous, uni- or trinerved, entire or with a few coarse, blunt teeth near the apex; heads sessile to subsessile in terminal or axillary glomerules, sometimes racemoid; receptacles epaleate; achenes glabrous, 1.0-1.8(-2.0) mm long, with 8-11 thin nerves; pappus bristles in 2(-3) series. Widespread in North and South America, apparently including many more species, and perhaps more sectional synonyms as well, than those listed below. *Baccharis angustifolia* and *B. glomeruliflora*, both of the southeastern United States, do not occur in México.

Species included: *Baccharis angustifolia* Michaux, *B. conferta* Kunth, *B. confertoides* Nesom, *B. dioica* Vahl, *B. emoryi* A. Gray, *B. glandulifera* Nesom, *B. glomeruliflora* Pers., *B. halimifolia* L., *B. heterophylla* Kunth, *B. lancifolia* Schlecht., *B. neglecta* Britt., *B. pilularis* DC., and *B. salicina* Torrey & A. Gray.

Additional representative species of South America: *Baccharis caespitosa* (Ruíz & Pavon) Pers., *B. chilco* Kunth, *B. macrantha* Kunth, *B. petiolata* DC., *B. spicata* (Lam.) Baill., *B. tricuneata* (L. f.) Pers., and *B. tridentata* Vahl.

Cuatrecasas (1967) chose *Baccharis tridentata* Vahl as the lectotype of sect. *Cylindricae* Heering, highly polyphyletic as constituted by Heering, with the

intention of synonymizing this name with that of sect. *Baccharis*. Espinar (1973) disagreed with this lectotypification and suggested that *B. santiagensis* Heering was a better choice. As defined by Espinar, the two sections apparently are not particularly closely related.

2. Sect. *Sergilae* DC., *Prodr.* 5:424. 1836. Lectotype species (Cuatrecasas 1967): *Baccharis scoparia* (L.) Pers.

Sect. *Aphyllae* Baker, *Fl. Bras.* 6(3):45. 1884. Type species: *Baccharis aphylla* DC.

Glabrous shrubs; leaves linear to linear oblanceolate, punctate, not papillate, glutinous, uninerved, entire; heads mostly solitary, sometimes in few headed, terminal glomerules; receptacles epaleate; achenes glabrous, 1.0-1.8 mm long, with 8-11 thin nerves; pappus bristles in 2(-3) series. Southwestern United States and adjacent México, South America.

Species included: *Baccharis sarothroides* A. Gray, *B. sergiloides* A. Gray, and *B. vanessae* Beauchamp.

Additional representative species of South America: *Baccharis genistifolia* DC., and *B. notosergila* Griseb.

These species are remarkable in their broomlike habit with narrow leaves and essentially solitary heads, but they appear to be closely related to sect. *Baccharis* on the basis of other features. I originally thought that sect. *Baccharis* would be paraphyletic without the inclusion of at least the North American sergiloid taxa but the resemblance between the North and South American species with this morphology is so close that they should be considered monophyletic, at least as a null hypothesis. The chemical data of Zdero, *et al.* (1986) also suggest that they are closely related.

3. Sect. *Aristidentes* Nesom, *sect. nov.* Type species: *Baccharis multiflora* Kunth, *Nov. Gen. & Sp. Pl.* 4 [folio]:46. 1818; 4 [quarto]:59. 1820. TYPE: MÉXICO. [Edo. México]: Tianguillo, [Sep-Oct, 1803], *Humboldt & Bonpland* [4372] (P fiche!). Kunth also cited a collection from near Toluca but only the plant from Tianguillo is represented on the fiche showing the P specimens.

Capitulis pedicellatis in capitulescentiis corymboideis et foliis papillati punctatis serraturis brevi-aristatis diagnoscenda.

Glabrous to puberulent shrubs or small trees; leaves oval to linear lanceolate, uni- or trinerved, often serrate with numerous, shallow teeth with aristate apices, punctate, each punctation usually with a minute but definitely extruded papilla, glutinous or not; heads pedicellate, in a corymboid capitulescence; phyllaries fringed ciliate; receptacles epaleate; achenes glabrous,



(1-)2-3 mm long, with 5-6(-8) relatively thick ribs; pappus bristles in (1-)2-3 series. Southwestern United States. México. and Central America. *Baccharis plummerae* A. Gray is known only from California.

Species included: *Baccharis bigelovii* A. Gray, *B. havardii* A. Gray, *B. mexicana* J. Cuatrecasas, *B. multiflora* Kunth, *B. palmeri* Greenm., *B. potosina* A. Gray, *B. plummerae*, *B. serraefolia* DC., *B. sordescens* DC., *B. sulcata* DC., *B. thesioides* Kunth, and *B. zamorensis* Rzedowski.

These taxa are somewhat similar to those of sect. *Molinae* but different in their leaves with papillate punctations and aristate serrate margins, their tendency to produce a vestiture of puberulent trichomes, and their pappus bristles mostly in 2-3 series. A study of the *Baccharis thesioides-bigelovii-sulcata* complex is in progress (Nesom, in prep.).

4. Sect. **Glandulocarpae** Nesom, *sect. nov.* Type species: *Baccharis wrightii* A. Gray, *Pl. Wright.* 1:101. 1852. TYPE: UNITED STATES. Texas: Jeff Davis Co., valley of the Limpia, Aug [1849], *C. Wright s.n.* (HOLOTYPE: GH).

Capitulis pedicellatis in capitulescentiis corymboideis et acheniis grandibus trichomatibus papillati-glandulosis imprimis diagnosenda.

Glabrous to minutely hispidulous shrubs or small trees; leaves mostly linear lanceolate, uninerved, entire or with a few shallow, blunt, subapical teeth, punctate, not papillate, usually glutinous; heads solitary or in racemoid panicle to corymboid capitulescences; receptacles epaleate; achenes (1.5-)2.0-4.5 mm long, with 5-6(-10) relatively thick ribs, sparsely to densely invested with thick, viscid, multicellular, often recurved or slightly coiled trichomes; pappus bristles in 3-5 series. Apparently restricted to México and the United States.

Species included: *Baccharis brachyphylla* A. Gray, *B. erosicola* Rzedowski, *B. macrocephala* Schultz-Bip. ex Greenm., *B. occidentalis* S.F. Blake, *B. pteronioides* DC., *B. pyramidata* (B.L. Robins. & Greenm.) Rzedowski, *B. ramiflora* A. Gray, *B. squarrosa* Kunth, *B. tezana* A. Gray, and *B. wrightii* A. Gray.

This group of species is highly diverse vegetatively. *Baccharis occidentalis* and *B. squarrosa* produce stems with solitary heads and greatly reduced leaves. Other species produce solitary heads on densely leafy stems or heads in racemoid panicle capitulescences. The large and distinctly pubescent achenes are found in all of the species. *Baccharis pyramidata* is tentatively included here, largely on the basis of its similarity in habit and capitulescence to *B. pteronioides*, but its stiffly strigose achenes and peculiar ericoid leaf morphology are anomalous among the Mexican species. The species of the South American sect. *Discolores* DC. are similar in leaf morphology but have a different capitulescence as well as details of the phyllaries and achenes.

5. Sect. *Baccharidastrum* (Cabrera) Nesom, *Phytologia* 65:170. 1988. BASIONYM: *Baccharidastrum* Cabrera, *Not. Mus. La Plata Bot.* 2:175. 1937. Type species: *Conyza triplinervia* Less. ( $\equiv$  *Baccharis vulnearia* Baker).

Glabrous, perennial herbs; leaves nearly linear to broadly lanceolate, strongly trinerved, shallowly serrate with numerous, nonaristate teeth, punctate, usually glutinous; heads pedicellate, in a tightly compact, corymboid capitulescence; receptacles epaleate; achenes densely and minutely hispidulous, 0.7-1.0 mm long, with 4(-6) thin ribs; pappus bristles in a single series. South America, with a single species in California and Baja California.

Species included: *Baccharis douglasii* DC.

Additional species of South America: *Baccharis breviseta* DC., *B. pingraea* DC., and *B. vulnearia* Baker.

Section *Baccharidastrum* previously included one dioecious species (*Baccharis pingraea*) and two monoecious ones (Nesom 1988). *Baccharis douglasii*, which is here added to the section, also is dioecious. It is so similar to some forms of *B. pingraea* that the two must be considered extremely closely related if not conspecific. *Baccharis pingraea*, however, is highly variable and a more detailed study is needed before an understanding of the overall pattern of variation can be reached. The plants of these species are recognized by their trinerved, closely serrulate leaves, small, minutely hispidulous achenes, and uniseriate pappus. These species were included in sect. *Molinae* by Espinar (1973), but because of their extremely distinctive achenial vestiture, I think they are best regarded as a separate group.

6. Sect. *Molinae* (Ruíz & Pavon) Pers., *Syn. Pl.* 2:424. 1807. BASIONYM: *Molina* Ruíz & Pavon, *Prodr.* 111, t. 24. 1794. Type species: *Baccharis latifolia* (Ruíz & Pavon) Pers.

Sect. *Trinervatae* DC., *Prodr.* 5:399. 1836. Type species: *Baccharis trinervis* Pers.

Sect. *Corymbosae* Heering in Reiche, *Fl. Chile* 4:5. 1903. Lectotype species (Cuatrecasas 1967), *Baccharis marginalis* DC.

Shrubs, small trees, sometimes sprawling or subscandent, glabrous or less commonly puberulent; leaves linear lanceolate to broadly ovate lanceolate or elliptic, trinerved, shallowly serrate with numerous, nonaristate teeth, less commonly entire, punctate, papillate, usually glutinous; heads pedicellate, in a corymboid capitulescence; phyllaries ovate and usually distinctly yellowish; pistillate receptacles epaleate or paleate; achenes glabrous, less commonly sparsely strigose, 1.0-1.8 mm long, with 4-6(-8) thin nerves; pappus bristles in a single series. México and Central America to South America; *Baccharis*

*salicifolia*, the most widespread species in the genus, extends from the southwestern United States to the southern tip of South America.

Species included (epaleate): *Baccharis monoica* Nesom, *B. salicifolia* (Ruiz & Pavon) Pers. ( $\equiv$  *B. glutinosa* Pers.); (paleate): *B. pedunculata* (Mill.) Cabrera, and *B. trinervis* Pers. (including *B. rhexioides* Kunth).

Additional representative species of South America (epaleate): *Baccharis prunifolia* Kunth; (paleate): *B. brachylaenoides* DC., and *B. cotinifolia* (Willd.) Urban (distinct from *B. pedunculata*, in contrast to the view of Cuatrecasas [1968]).

These species with paleate and epaleate receptacles have not previously been regarded as closely related, but I can find no other differences among what is otherwise a group of species with an easily recognizable set of morphological similarities. The species with paleate receptacles were included by Cabrera (1955) in a broad and highly heterogeneous genus *Psila*, united only by the paleate receptacles of the pistillate heads. More recently, Cuatrecasas (1982) considered these all to be species of *Baccharis*, formally dividing them into three different sections: sect. *Trinervatae*, sect. *Psila* (Phil.) J. Cuatrecasas, and sect. *Pseudobaccharis* (Cabrera) J. Cuatrecasas. A situation analogous to that in sect. *Molinae* is found in the "paleate" species of the genus *Heterothalamus* and a number of the "epaleate" species included in sect. *Pseudobaccharis*, where no other difference in morphology can be found to separate them.

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*CAREX FISSA*, SECTION *MULTIFLORAE* (CYPERACEAE), NEW TO  
TEXAS

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ABSTRACT

*Carex fissa* Mackenzie, Section *Multiflorae* (Cyperaceae), previously unreported in Texas, which resembles *C. annectens* (Bickn.) Bickn. has been found in several Texas counties: Austin, Colorado, Franklin, Hopkins, Galveston, and Raines.

KEY WORDS: *Carex fissa*, *Carex* section *Multiflorae*, Cyperaceae, Texas.

*Carex* section *Multiflorae* Kunth is represented by thirteen species in the temperate and warmer parts of North America; by a number of species in eastern Asia, and by two in South America (Mackenzie 1931). Four species of section *Multiflorae* are now found in Texas: *Carex annectens* (Bickn.) Bickn., *C. fissa* Mackenzie, *C. triangularis* Boeck., and *C. vulpinoidea* Michaux. *Carex annectens* and *C. triangularis* were treated by Correll & Johnston (1970) under *C. vulpinoidea*. Correll & Johnston (1970), Correll & Correll (1972), Gould (1975), Mahler (1988), nor Johnston (1988) have listed *Carex fissa* as occurring in Texas.

*Carex fissa*, a southeastern species, was first described from Sapulpa, in eastern Oklahoma (Mackenzie 1931) where it was believed to be an endemic. Since Hermann (1965) described *Carex fissa* var. *aristata* Hermann from north central Florida, *Carex fissa* has been found throughout the Gulf States. The habitat in Texas is similar to what Godfrey & Wooten (1979) described for *Carex fissa* var. *aristata* in north and north central Florida; wet woodlands, pine flatwoods, wet clearings, and ditches. This treatment does not recognize varieties. However, if the reader is interested, Hermann (1965) provides a key to separate varieties as seen by him. The following key will help differentiate the closely related taxa of section *Multiflorae* found in Texas.

KEY TO TEXAS SECTION *MULTIFLORAE*

1. Most leaves equal to or exceeding the culms; perigynia 1.0-1.8 mm broad, narrowly ovate; beak of the perigynium tapering from the body, beak 1/2 as long as the body to as long as body ..... *C. vulpinoidea*
- 1' Most leaves shorter than the culms; perigynia 1.6-3.0 mm broad, narrowly ovate to broadly ovate, orbicular to reniform; beak of the perigynium tapering or arising abruptly from the body, beak to 1/2 the length of the body ..... 2
2. Perigynia very conspicuous in the infructescence; perigynia 2.4-3.0 mm broad, orbicular to reniform, often broader than long, with red glandular dots; beak of perigynium arising abruptly from the body; perigynial scales not conspicuous; apex of membranous inner band of the upper leaves somewhat thickened, prolonged and usually sharply rounded ..... *C. triangularis*
- 2' Perigynia conspicuous or not in the infructescence; perigynia 1.6-2.7 mm broad, narrowly ovate to ovate orbicular, rarely broader than long, with or without red glandular dots; beak of perigynium tapering or arising abruptly from the body; perigynial scales usually conspicuous; apex of membranous inner band of the upper leaves somewhat thickened or not, prolonged and slightly rounded ..... 3
3. Base of culms 2.5-3.0(-4.5) mm thick; rhizomes not elongate; perigynia 1.6-2.4 mm broad, occasionally with red glandular dots apically; beak of perigynium usually arising abruptly from body, (infrequently tapering); apex of the membranous inner band of the upper leaves somewhat thickened ... *C. annectens*
- 3' Base of culms (3.0-)3.5-6.0 mm thick; rhizomes elongate; perigynia 2.0-2.7 mm broad, never with red glandular dots; beak of perigynium usually tapering from body, (infrequently arising abruptly); apex of the membranous inner band of the upper leaves friable, not thickened ..... *C. fissa*

Specimens collected: UNITED STATES. Texas: Franklin Co., 9.2 miles (14.7 kilometers) N on Hwy 37 from its jct. with Hwy 196, N of Mt. Vernon, 15 May 1989, *S. & G. Jones 2852 & Tim Powell* (ASTC, MICH, TAES). It was frequent in open wet areas adjacent to White Oak Creek. Associated species: *Carex amphibola* Steud., *C. lupulina* Muhl., *C. crus-corvi* Kunze, *C. arkansana* Bailey, *C. annectens*, *C. typhina* Michaux, *C. bushii* Mackenzie, *C. reniformis* (Bailey) Small, *Iris brevicaulis* Rafinesque, *Danthonia spicata* (L.) Beauv., *Lolium perenne* L., *Stipa leucotricha* Trin. & Rupr., *Asclepias amplexicaulis*

Small, and *A. viridis* Walt. Galveston Co., Pelican Island, 4.2 miles (6.7 kilometers) E on main road through Pelican Island from its jct. with Port Ind. Blvd., 08 May 1989, *S. Jones 2718* & *J. Wipff* (ASTC, MICH, SMU, SRSU, SWT, TAES, WARM). It was occasional in an open hydric roadside ditch. Associated species: *Carex triangularis*, *C. brittoniana* Bailey, *C. cherokeensis* Schwein., *C. crus-corvi*, *C. leavenworthii* Dew., *C. amphibola*, *Eleocharis albida* Torrey, *Scirpus maritimus* L., *Asclepias perennis* Walt., *Spartina spartinae* (Trin.) Hitchc., *Setaria geniculata* (Lam.) Beauv., and *Tamarix* sp. Raines Co., South side of Lake Fork Reservoir at the lake's crossing of FR 2946, 13 May 1989, *S. & G. Jones 2839* (ASTC, MICH, TAES). It was frequent around the mesic to hydric lakeside in red clayey soil. Associated species *Carex crus-corvi*, *C. hyalinolepis* Steud., *Carex flaccosperma* Dew., *Scirpus pendulus*, *Eleocharis* sp., and *Juncus* spp.

Additional specimens: UNITED STATES. Texas: Austin Co., 8 April 1939, *B. Tharp 43279* (TEX). Colorado Co., 03 May 1948, *E. Whitehouse 19871* (SMU). Gregg Co., 20 April, 1988, *E. Nizon 16568* (ASTC, TAES). Hopkins Co., 08 June 1953, *L. Shinnery 15037* (SMU); 05 June 1989, *A.A. Reznicek 8484* & *R.F.C. Naczi* (MICH, TAES).

A careful examination of *Carex* section *Multiflorae* specimens in other herbaria should yield additional Texas specimens.

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## TAXONOMIC OVERVIEW OF THE *SENECIO FLACCIDUS* COMPLEX IN NORTH AMERICA, INCLUDING *S. DOUGLASII*

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### ABSTRACT

The earliest specific name for the widespread North American taxon long known as *Senecio douglasii* DC. is shown to be *S. flaccidus* Less. This has occasioned two new infraspecific combinations in the complex, including: *Senecio flaccidus* Less. var. *douglasii* (DC.) B. Turner & T. Barkley, *comb. nov.*, and *S. flaccidus* Less. var. *monoensis* (E. Greene) B. Turner & T. Barkley, *comb. nov.* A key to the taxa and a map showing their distribution in México is provided.

KEY WORDS: *Senecio*, Asteraceae, Senecioneae, taxonomy, nomenclature, North America.

Preparation of a treatment of *Senecio* (sensu lato) for México (Barkley & Turner, in prep.) has revealed that *S. douglasii* DC., long recognized as the name for a common, widespread, highly variable, perennial subshrub of the western United States (Barkley 1978) and México, must be replaced by the earlier name, *S. flaccidus* Less., which is typified by material originally collected along the semi-arid western slopes of Cofre de Perote, Veracruz, México (near the village of Perote).

Material from the type locality and throughout most of northern México is essentially indistinguishable from what Barkley (1978) has treated as *Senecio douglasii* var. *longilobus* (Benth.) Benson. The latter taxon is known to intergrade with *S. douglasii* var. *douglasii* in northern México and adjacent Arizona, and both of these appear to intergrade with *S. douglasii* var. *monoensis* (E. Greene) Jepson over at least part of their distribution. In order to provide correct names for members of the "*S. douglasii*" complex, we have provided here an overview of the *S. flaccidus* complex as it appears in México. Except where noted, types for most of the names referred to in the present paper are

accounted for by Barkley (1978). The distributional map (Figure 1) is based upon a wide range of material available on loan to the junior author and a large assortment of collections (LL, TEX) available to the senior author.

*Senecio flaccidus* Less., *Linnaea* 5:161. 1830.

Perennial subshrubs or rarely appearing annual, 3-12 dm high, persistently tomentose to variously glabrate; stems several, mostly branched in the upper third, arching upward from a taprooted, woody base; leaves about equally distributed along the stem, linear to narrowly filiform, or deeply pinnatifid into long, narrow segments, 2-10+ cm long overall, sometimes with fascicles of smaller leaves in the axils of the principal leaves; inflorescence a series of corymbiform or subcorymbiform cymes, each with 3-10(-20+) cylindrical or campanulate heads; involucre bracts ca. 21 or 13, 5-8+ mm long, greenish or stramineous at the tip, not black tipped; calyculate bracts prominent and up to 1/2 as long as the principal bracts, or reduced and inconspicuous, or sometimes absent; ray florets ca. 13 or 8, the ligule 10-15(-20) mm long, yellow or sometimes light yellow to ochroleucous; achenes canescent hirtellous; chromosome number,  $n = 20$  pairs.

A widespread, common and complicated entity that has long gone under the name *Senecio douglasii* in the U.S.A. It is well adapted to sites with continual, mild disturbance. Three regional intergrading varieties are recognized, but subsequent studies may alter this concept of the species.

#### Key to *Senecio flaccidus* Varieties in México

1. Heads subcylindrical when young, principal involucre bracts ca. 13 or 21, 5-8+ mm long, calyculate bracts absent or inconspicuous; herbage tomentose with long, lanate hairs, sometimes unevenly glabrate; northern México, south to Puebla and Veracruz .....var. *flaccidus*
- 1' Heads large and campanulate, principal involucre bracts ca. 21, 7-10+ mm long, calyculate bracts usually prominent and up to 1/2 as long as the principal bracts ..... 2
2. Herbage glabrous or nearly so at maturity; Baja California, Sonora .....var. *monoensis*
- 2' Herbage tomentose with persistent short, grayish hairs, sometimes unevenly tomentose; northern Sonora .....var. *douglasii*

*Senecio flaccidus* Less. var. *douglasii* (DC.) B. Turner & T. Barkley, *comb. nov.* BASIONYM: *Senecio douglasii* DC., *Prodr.* 6:429. 1837.

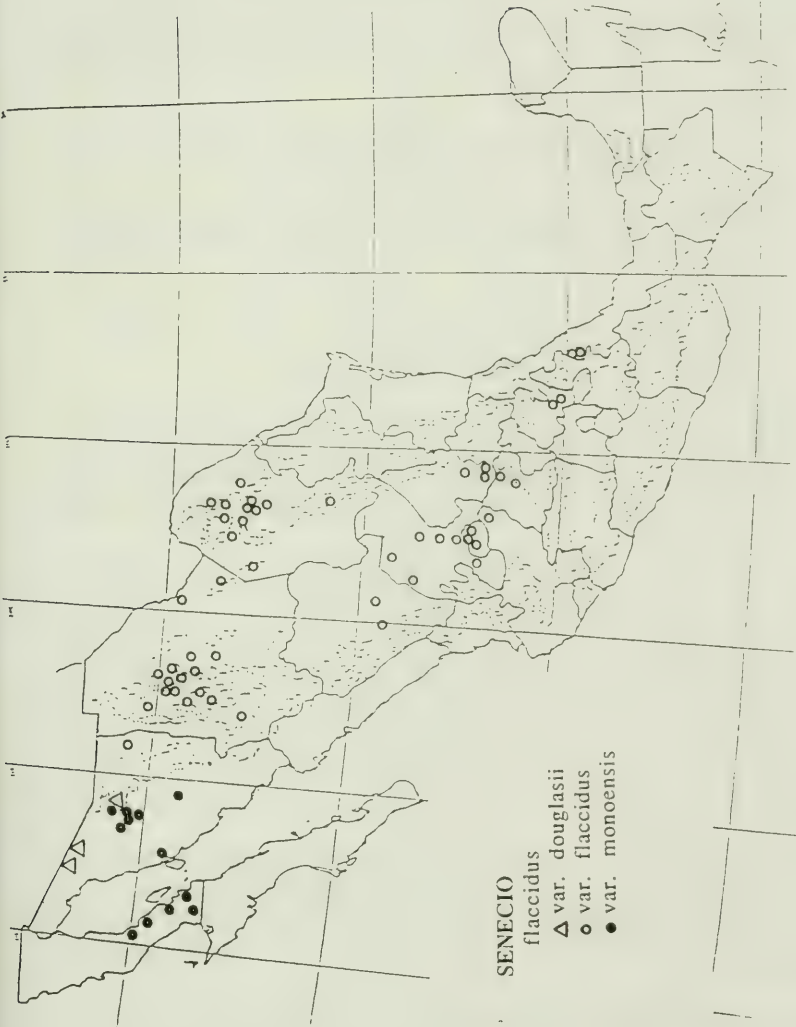


Fig. 1. Distribution of *Senecio flaccidus* in Mexico.

*Senecio douglasii* DC. var. *tularensis* Munz, El Aliso 4:99. 1958.

Known in México from only a few questionable collections in northern Sonora (extending into México from a much wider distribution in the U.S.A.), open sandy or rocky sites in desert hills, mostly below 1500 m, July-October.

*Senecio flaccidus* Less. var. *flaccidus* TYPE: MÉXICO. Veracruz: "In llanos de Perote," Sep 1819, *Schiede & Deppe s.n.* (HOLOTYPE: B?, not examined; drawing in GH!).

*Senecio douglasii* DC. var. *jamesii* (Torrey & A. Gray) Ediger ex Correll & Johnston, *Man. Vasc. Pl. Tex.* 1712. 1970.

*Senecio douglasii* DC. var. *longilobus* (Benth.) Benson, *Amer. J. Bot.* 30:631. 1943. BASIONYM: *Senecio longilobus* Benth., *Pl. Hartw.* 18. 1839.

*Senecio orthophyllus* E. Greene, *Leaflet Bot. Observ. Crit.* 1:221. 1906.

*Senecio filifolius* Nutt., *Trans. Amer. Phil. Soc. II.* 7:414. 1841.

*Senecio regiomontanus* DC., *Prodr.* 6:429. 1838.

Scattered through the Central Plateau of northern México southwards to Puebla and adjacent Veracruz (Figure 1), occurring mostly in open sandy or rocky floodplains, creek beds, roadsides, and similar, mildly disturbed places in open desert regions, chiefly below 2000 m, also adjacent U.S.A.; flowering the year around.

The typical var. *flaccidus* passes into the other two varieties in the U.S.A., where their distributions overlap. Occasional specimens of both var. *monoensis* and var. *douglasii* from México approach var. *flaccidus*, although neither of the former are clearly sympatric with the latter in México. Var. *flaccidus* apparently intergrades to some extent with *Senecio stoechadiformis* in México along the eastern edges of the Sierra Madre Occidental. Additional study may indicate that var. *flaccidus*, as conceived here, incorporates two or more morphological phases, based on head size, distribution and duration of pubescence, and gross aspect. Whether or not these phases warrant taxonomic recognition is yet to be determined.

The type specimen of *Senecio flaccidus* was apparently at Berlin and it has not been examined. However, a pen and ink tracing of the type is among the Klatt materials at GH. This drawing, plus the excellent original description and comparison with more recent collections, leaves no doubt as to the application of the name.

***Senecio flaccidus* Less. var. *monoensis* (E. Greene) B. Turner & T. Barkley, *comb. nov.* BASIONYM: *Senecio monoensis* E. Greene, *Leaflet Bot. Observ. Crit.* 1:221. 1906. *Senecio douglasii* DC. var. *monoensis* (E. Greene) Jepson, *Man. Fl. Pl. Calif.* 1149. 1925.**



*Senecio filicifolius* Greenm., Ann. Missouri Bot. Gard. 1:774. 1914.

*Senecio lathyroides* E. Greene, Leaf. Bot. Observ. Crit. 2:21. 1909.

This variety occurs in northwestern México (Figure 1) and adjacent U.S.A., where it is frequent in open, rocky or sandy sites, especially on alluvial fans and floodplains in the low desert, in México mostly below 800 m; flowering all seasons.

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